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THE

# AMERICAN EPHEMERIS

AND

# NAUTICAL ALMANAC.

FOR THE YEAR

## 1856.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF THE NAVY.

WASHINGTON.
1853.

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Per [illegible]

1854 May 15

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# PREFACE

## TO THE FIRST VOLUME.

The preparation of this work was begun in the latter part of the year 1849, in accordance with an act of Congress, approved on the 3d of March of that year. An account of this preparation, its details, the values of the constants adopted, and the means employed in various parts of the work to secure additional accuracy or greater convenience, will be found in the article "On the Construction of the Ephemeris," contained in the Appendix to this volume.

An article "On the Arrangement and Use of the Tables" will also be found in this volume, to which the student is referred for instruction.

The theoretical department of the work has been placed under the special direction of Professor Benjamin Peirce, LL.D., and most of the calculations have passed under his final revision.

It is due to the memory of the late Nathaniel Bowditch, LL.D., the illustrious commentator of La Place, to say, that his zeal in enriching the library of the University at Cambridge, that of the American Academy of Arts and Sciences, and his private library, still preserved and accessible to students, with the best works in astronomical science, and his influence in promoting and diffusing in America a love for this branch of knowledge, have greatly facilitated the labor of preparing the American Ephemeris for publication in its present form.

CHARLES HENRY DAVIS,
*Lieut. U. S. Navy, Superintendent.*

Cambridge, *October* 1, 1852.

# ERRATUM

## IN THE NAUTICAL PART OF THE EPHEMERIS FOR 1855.

---

Page 115, in the column of *Diff. for* 1 *hour*, of Horizontal Parallax, from Noon, the — and + signs on the 12th and 13th lines should be put one line lower, so as to read —0.05 instead of +0.05. This is corrected in the cheap edition.

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# ERRATA

## IN THE FIRST EDITION OF THE EPHEMERIS FOR 1855.

---

### *Astronomical Part.*

Page 306, thirteenth line from bottom, for 21° read 1°; and next line, for page 221, read page 222.
“ 354, last line, “Log. Rad. Vect. $= \rho$,” for 901060, read 001060.
“ 355, first line, “ “ “ “ “ 9.9 “ 0.0.
“ 356, “ “ “ “ “ “ “ “ “ “
“ 361, “ “ “ “ “ “ “ 0.0 “ 9.9.
“ “ Dele ⊡ on second line.
“ 366, Neptune, first line, “Days fr. begin'g of Julian Period,” for 8000, read 8600.
“ 368, lines 12, 16, for *Nov.*, read *May;* and for 337° 14′, read 37° 14′.
“ 372, Append Note: — “To reduce the map to Washington, add 26° to the longitudes; to reduce to Greenwich, add 103°.”
“ 373, line 7, headings of columns, for *log G*, read *log H;* and for *log H*, read *log G.*
“ 374, change the decimal point one place to the right in the columns of this page; thus, for 817.0, read 8170.

### *Use of the Tables.*

Page 465, in the formulas for computation of the interval $t$, omit log $H' = 1.3757$; and for $+ H' h \sin(\mu - \lambda)$, read $- H h \mu' \sin(\mu - \lambda)$; and for $- b' \cot \psi'$, read $+ b' \cot \psi$.
“ 466, third line, for $\psi - \chi$, read $\psi + \chi$.

Note. — *The preceding corrections in the formulas add to mean time of end, in the example,* $4^{s}.5$.

“ 474, twenty-eighth line, for *west*, read *east;* and on the next line, for *east*, read *west;* and for *after*, read *before.*

### *Appendix.*

Page 7, eighth line, “Jupiter's Vertical Semidiameter,” for 19″.19, read 18″.62.
“ 19, seventh and eighth lines, for *increasing* and *decreasing*, read *decreasing* and *increasing.*

In the Ephemeris of Neptune for 1853, the times of meridian transit are two minutes too late. This error was not in the original computations of the distinguished and deeply lamented astronomer, Mr. Sears C. Walker. The ephemeris is correct.

# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1856, WHICH COMPRISES THE LATTER PART OF THE 80TH AND THE BEGINNING OF THE 81ST YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO

The year **6569** of the Julian Period; to the latter part of
“ **5616** and the beginning of
“ **5617** of the creation of the world, according to the Jews;
“ **2609** since the foundation of Rome, according to Varro;
“ **2603** of the era of Nabonassar, which has been assigned to Wednesday, the **26**th of February, of the **3967**th year of the Julian Period, corresponding, according to the chronologists, to the 747th, and according to the astronomers, to the 746th year before the birth of Christ;
“ **2632** of the Olympiads, or the fourth year of the 658th Olympiad, commencing in July, 1853, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period; to the latter part of
“ **1272** and the beginning of
“ **1273** (of twelve lunations) since the Hegira, or flight of Mahomet, which, as is generally supposed, took place on the 16th of July, in the year 622 of the Christian era; and, finally, to
“ **7364–5** of the Byzantine era.

The year 1272 of the Mohammedan era begins on the 13th of September, 1855, and ends on the 31st of August, 1856.

The year 5616 of the Jewish era begins on the 13th of September, 1855, and ends on the 29th of September, 1856.

The first day of January of the year 1856 is the 2,398,950th day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

| | | | |
|---|---|---|---|
| Dominical Letters | F E | Solar Cycle | 17 |
| Epact | 23 | Roman Indiction | 14 |
| Lunar Cycle or Golden Number | 14 | Julian Period | 6569 |

# SYMBOLS AND ABBREVIATIONS.

## SIGNS OF THE PLANETS, &c.

| | | | |
|---|---|---|---|
| ☉ | The Sun. | ♂ | Mars. |
| ☾ | The Moon. | ♃ | Jupiter. |
| ☿ | Mercury. | ♄ | Saturn. |
| ♀ | Venus. | ♅ | Uranus. |
| ⊕ or ♁ | The Earth. | ♆ | Neptune. |

## SIGNS OF THE ZODIAC.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Spring signs. | 1. | ♈ | Aries. | Autumn signs. | 7. | ♎ | Libra. |
| | 2. | ♉ | Taurus. | | 8. | ♏ | Scorpio. |
| | 3. | ♊ | Gemini. | | 9. | ♐ | Sagittarius. |
| Summer signs. | 4. | ♋ | Cancer. | Winter signs. | 10. | ♑ | Capricornus. |
| | 5. | ♌ | Leo. | | 11. | ♒ | Aquarius. |
| | 6. | ♍ | Virgo. | | 12. | ♓ | Pisces. |

## ASPECTS.

| | | | | |
|---|---|---|---|---|
| ☌ | Conjunction, or having the same Longitude | or | Right | Ascension. |
| □ | Quadrature, or differing 90° in | " | " | " |
| ☍ | Opposition, or differing 180° in | " | " | " |

## ABBREVIATIONS.

| | | | |
|---|---|---|---|
| ☊ | Ascending Node. | ′ | Minutes of Arc. |
| ☋ | Descending Node. | ″ | Seconds of Arc. |
| N. | North. S. South. | $^{h}$ | Hours. |
| E. | East. W. West. | $^{m}$ | Minutes of Time. |
| ° | Degrees. | $^{s}$ | Seconds of Time. |

# ASTRONOMICAL EPHEMERIS

FOR THE USE OF

# NAVIGATORS.

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be added to Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semi-diameter. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Tues. | 1 | 18 44 56.79 | 11.047 | S.23 3 28.6 | 11.85 | 16 18.42 | 71.06 | 3 36.03 | 1.192 |
| Wed. | 2 | 18 49 21.93 | 11.034 | 22 58 28.6 | 12.99 | 16 18.41 | 71.02 | 4 4.49 | 1.180 |
| Thur. | 3 | 18 53 46.67 | 11.020 | 22 53 2.6 | 14.14 | 16 18.40 | 70.99 | 4 32.58 | 1.166 |
| Fri. | 4 | 18 58 11.06 | 11.004 | 22 47 9.1 | 15.28 | 16 18.38 | 70.96 | 5 0.34 | 1.150 |
| Sat. | 5 | 19 2 35.07 | 10.987 | 22 40 48.5 | 16.42 | 16 18.36 | 70.90 | 5 27.72 | 1.132 |
| *Sun.* | 6 | 19 6 58.65 | 10.969 | 22 34 0.9 | 17.53 | 16 18.34 | 70.84 | 5 54.66 | 1.113 |
| Mon. | 7 | 19 11 21.75 | 10.950 | 22 26 46.5 | 18.64 | 16 18.31 | 70.78 | 6 21.14 | 1.092 |
| Tues. | 8 | 19 15 44.38 | 10.930 | 22 19 5.5 | 19.74 | 16 18.28 | 70.71 | 6 47.15 | 1.071 |
| Wed. | 9 | 19 20 6.50 | 10.907 | 22 10 58.0 | 20.84 | 16 18.25 | 70.64 | 7 12.63 | 1.048 |
| Thur. | 10 | 19 24 28.06 | 10.883 | 22 2 24.5 | 21.92 | 16 18.21 | 70.57 | 7 37.56 | 1.025 |
| Fri. | 11 | 19 28 49.03 | 10.858 | 21 53 25.0 | 23.00 | 16 18.17 | 70.49 | 8 1.91 | 1.002 |
| Sat. | 12 | 19 33 9.39 | 10.833 | 21 44 0.1 | 24.05 | 16 18.13 | 70.41 | 8 25.65 | 0.977 |
| *Sun.* | 13 | 19 37 29.14 | 10.808 | 21 34 9.9 | 25.10 | 16 18.08 | 70.32 | 8 48.78 | 0.950 |
| Mon. | 14 | 19 41 48.25 | 10.780 | 21 23 54.6 | 26.13 | 16 18.02 | 70.22 | 9 11.27 | 0.922 |
| Tues. | 15 | 19 46 6.68 | 10.751 | 21 13 14.7 | 27.16 | 16 17.96 | 70.13 | 9 33.08 | 0.894 |
| Wed. | 16 | 19 50 24.42 | 10.722 | 21 2 10.5 | 28.16 | 16 17.90 | 70.04 | 9 54.20 | 0.865 |
| Thur. | 17 | 19 54 41.44 | 10.693 | 20 50 42.0 | 29.16 | 16 17.83 | 69.94 | 10 14.61 | 0.835 |
| Fri. | 18 | 19 58 57.72 | 10.663 | 20 38 50.0 | 30.13 | 16 17.75 | 69.85 | 10 34.28 | 0.806 |
| Sat. | 19 | 20 3 13.28 | 10.633 | 20 26 34.5 | 31.10 | 16 17.66 | 69.75 | 10 53.23 | 0.775 |
| *Sun.* | 20 | 20 7 28.09 | 10.601 | 20 13 56.1 | 32.05 | 16 17.57 | 69.65 | 11 11.42 | 0.743 |
| Mon. | 21 | 20 11 42.14 | 10.568 | 20 0 55.0 | 33.00 | 16 17.48 | 69.55 | 11 28.88 | 0.711 |
| Tues. | 22 | 20 15 55.42 | 10.536 | 19 47 31.3 | 33.91 | 16 17.38 | 69.45 | 11 45.56 | 0.679 |
| Wed. | 23 | 20 20 7.93 | 10.504 | 19 33 45.7 | 34.82 | 16 17.26 | 69.34 | 12 1.46 | 0.647 |
| Thur. | 24 | 20 24 19.66 | 10.471 | 19 19 38.5 | 35.71 | 16 17.14 | 69.24 | 12 16.60 | 0.615 |
| Fri. | 25 | 20 28 30.61 | 10.438 | 19 5 10.0 | 36.61 | 16 17.03 | 69.12 | 12 30.95 | 0.582 |
| Sat. | 26 | 20 32 40.76 | 10.405 | 18 50 20.5 | 37.47 | 16 16.91 | 69.01 | 12 44.50 | 0.549 |
| *Sun.* | 27 | 20 36 50.12 | 10.372 | 18 35 10.3 | 38.33 | 16 16.78 | 68.90 | 12 57.29 | 0.516 |
| Mon. | 28 | 20 40 58.71 | 10.339 | 18 19 39.9 | 39.16 | 16 16.65 | 68.78 | 13 9.28 | 0.483 |
| Tues. | 29 | 20 45 6.48 | 10.306 | 18 3 49.7 | 39.99 | 16 16.51 | 68.66 | 13 20.45 | 0.450 |
| Wed. | 30 | 20 49 13.45 | 10.273 | 17 47 40.0 | 40.78 | 16 16.36 | 68.55 | 13 30.84 | 0.416 |
| Thur. | 31 | 20 53 19.62 | 10.239 | 17 31 11.2 | 41.56 | 16 16.22 | 68.43 | 13 40.43 | 0.383 |
| Fri. | 32 | 20 57 24.97 | 10.206 | S.17 14 23.6 | 42.34 | 16 16.07 | 68.32 | 13 49.20 | 0.349 |

NOTE. — *Mean* Time of the Semidiameter passing may be foupd by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | Equation of Time, *to be subtracted from Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Tues. | 1 | 18 44 56.20 | 11.047 | 23 3 27.7 | 11.85 | 3 35.98 | 1.192 | 18 41 20.22 |
| Wed. | 2 | 18 49 21.18 | 11.034 | 22 58 29.4 | 12.99 | 4 4.41 | 1.180 | 18 45 16.77 |
| Thur. | 3 | 18 53 45.83 | 11.020 | 22 53 3.6 | 14.14 | 4 32.50 | 1.166 | 18 49 13.33 |
| Fri. | 4 | 18 58 10.14 | 11.004 | 22 47 10.3 | 15.28 | 5 0.25 | 1.150 | 18 53 9.89 |
| Sat. | 5 | 19 2 34.07 | 10.987 | 22 40 49.9 | 16.42 | 5 27.62 | 1.132 | 18 57 6.45 |
| *Sun.* | 6 | 19 6 57.57 | 10.969 | 22 34 2.5 | 17.53 | 5 54.56 | 1.113 | 19 1 3.01 |
| Mon. | 7 | 19 11 20.60 | 10.950 | 22 26 48.4 | 18.64 | 6 21.03 | 1.092 | 19 4 59.57 |
| Tues. | 8 | 19 15 43.15 | 10.930 | 22 19 7.6 | 19.74 | 6 47.03 | 1.071 | 19 8 56.12 |
| Wed. | 9 | 19 20 5.19 | 10.907 | 22 11 0.4 | 20.84 | 7 12.51 | 1.048 | 19 12 52.68 |
| Thur. | 10 | 19 24 26.68 | 10.883 | 22 2 27.2 | 21.92 | 7 37.43 | 1.025 | 19 16 49.25 |
| Fri. | 11 | 19 28 47.58 | 10.858 | 21 53 28.0 | 23.00 | 8 1.78 | 1.002 | 19 20 45.80 |
| Sat. | 12 | 19 33 7.88 | 10.833 | 21 44 3.4 | 24.05 | 8 25.52 | 0.977 | 19 24 42.36 |
| *Sun.* | 13 | 19 37 27.56 | 10.808 | 21 34 13.5 | 25.10 | 8 48.64 | 0.950 | 19 28 38.92 |
| Mon. | 14 | 19 41 46.60 | 10.780 | 21 23 58.5 | 26.13 | 9 11.13 | 0.922 | 19 32 35.47 |
| Tues. | 15 | 19 46 4.97 | 10.751 | 21 13 18.9 | 27.16 | 9 32.94 | 0.894 | 19 36 32.03 |
| Wed. | 16 | 19 50 22.65 | 10.722 | 21 2 15.0 | 28.16 | 9 54.06 | 0.865 | 19 40 28.59 |
| Thur. | 17 | 19 54 39.62 | 10.693 | 20 50 46.9 | 29.16 | 10 14.47 | 0.834 | 19 44 25.15 |
| Fri. | 18 | 19 58 55.85 | 10.663 | 20 38 55.2 | 30.13 | 10 34.14 | 0.806 | 19 48 21.71 |
| Sat. | 19 | 20 3 11.36 | 10.633 | 20 26 40.1 | 31.10 | 10 53.10 | 0.775 | 19 52 18.26 |
| *Sun.* | 20 | 20 7 26.12 | 10.601 | 20 14 2.0 | 32.05 | 11 11.29 | 0.743 | 19 56 14.83 |
| Mon. | 21 | 20 11 40.13 | 10.568 | 20 1 1.2 | 33.00 | 11 28.75 | 0.711 | 20 0 11.38 |
| Tues. | 22 | 20 15 53.37 | 10.536 | 19 47 37.9 | 33.91 | 11 45.43 | 0.679 | 20 4 7.94 |
| Wed. | 23 | 20 20 5.84 | 10.504 | 19 33 52.6 | 34.82 | 12 1.34 | 0.647 | 20 8 4.50 |
| Thur. | 24 | 20 24 17.53 | 10.471 | 19 19 45.7 | 35.71 | 12 16.48 | 0.615 | 20 12 1.05 |
| Fri. | 25 | 20 28 28.44 | 10.438 | 19 5 17.5 | 36.61 | 12 30.83 | 0.582 | 20 15 57.61 |
| Sat. | 26 | 20 32 38.56 | 10.405 | 18 50 28.3 | 37.47 | 12 44.39 | 0.549 | 20 19 54.17 |
| *Sun.* | 27 | 20 36 47.90 | 10.372 | 18 35 18.5 | 38.33 | 12 57.18 | 0.516 | 20 23 50.72 |
| Mon. | 28 | 20 40 56.46 | 10.339 | 18 19 48.4 | 39.16 | 13 9.18 | 0.483 | 20 27 47.28 |
| Tues. | 29 | 20 45 4.20 | 10.306 | 18 3 58.5 | 39.99 | 13 20.36 | 0.450 | 20 31 43.84 |
| Wed. | 30 | 20 49 11.14 | 10.273 | 17 47 49.1 | 40.78 | 13 30.75 | 0.416 | 20 35 40.39 |
| Thur. | 31 | 20 53 17.30 | 10.239 | 17 31 20.5 | 41.58 | 13 40.35 | 0.383 | 20 39 36.95 |
| Fri. | 32 | 20 57 22.63 | 10.206 | 17 14 33.2 | 42.34 | 13 49.12 | 0.349 | 20 43 33.51 |

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S |  |  |  |  |  |  | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | *True* LONGITUDE. |  |  |  |  | Diff. for 1 hour. | LATITUDE. |  |  |  |  |  |
|  |  | λ |  |  | λ′ |  |  |  |  |  |  |  |  |
|  |  | ° | ′ | ″ | ′ | ″ | ″ | ″ |  |  | h. | m. | s. |
| 1 | 1 | 280 | 19 | 55.7 | 20 | 3.6 | 152.94 | +0.10 | 9.9926549 | 0.9 | 5 | 17 | 47.57 |
| 2 | 2 | 281 | 21 | 6.1 | 21 | 13.9 | 152.94 | —0.04 | .9926581 | 1.6 | 5 | 13 | 51.67 |
| 3 | 3 | 282 | 22 | 16.8 | 22 | 24.4 | 152.94 | 0.16 | .9926633 | 2.4 | 5 | 9 | 55.76 |
| 4 | 4 | 283 | 23 | 27.7 | 23 | 35.1 | 152.95 | 0.29 | .9926704 | 3.1 | 5 | 5 | 59.85 |
| 5 | 5 | 284 | 24 | 38.7 | 24 | 45.9 | 152.95 | 0.39 | .9926792 | 3.9 | 5 | 2 | 3.93 |
| 6 | 6 | 285 | 25 | 49.7 | 25 | 56.7 | 152.96 | 0.48 | .9926897 | 4.7 | 4 | 58 | 8.02 |
| 7 | 7 | 286 | 27 | 0.5 | 27 | 7.3 | 152.95 | 0.53 | .9927019 | 5.4 | 4 | 54 | 12.10 |
| 8 | 8 | 287 | 28 | 11.0 | 28 | 17.6 | 152.94 | 0.56 | .9927159 | 6.2 | 4 | 50 | 16.19 |
| 9 | 9 | 288 | 29 | 21.3 | 29 | 27.7 | 152.93 | 0.57 | .9927315 | 6.9 | 4 | 46 | 20.28 |
| 10 | 10 | 289 | 30 | 31.3 | 30 | 37.5 | 152.92 | 0.53 | .9927488 | 7.5 | 4 | 42 | 24.36 |
| 11 | 11 | 290 | 31 | 40.7 | 31 | 46.7 | 152.91 | 0.46 | .9927679 | 8.3 | 4 | 38 | 28.46 |
| 12 | 12 | 291 | 32 | 49.5 | 32 | 55.4 | 152.89 | 0.37 | .9927887 | 9.1 | 4 | 34 | 32.55 |
| 13 | 13 | 292 | 33 | 57.6 | 34 | 3.3 | 152.86 | 0.28 | .9928113 | 10.0 | 4 | 30 | 36.63 |
| 14 | 14 | 293 | 35 | 5.0 | 35 | 10.5 | 152.82 | 0.16 | .9928360 | 10.8 | 4 | 26 | 40.72 |
| 15 | 15 | 294 | 36 | 11.7 | 36 | 17.0 | 152.78 | —0.03 | .9928630 | 11.7 | 4 | 22 | 44.80 |
| 16 | 16 | 295 | 37 | 17.5 | 37 | 22.6 | 152.73 | +0.11 | .9928922 | 12.6 | 4 | 18 | 48.90 |
| 17 | 17 | 296 | 38 | 22.5 | 38 | 27.4 | 152.69 | 0.22 | .9929237 | 13.6 | 4 | 14 | 52.98 |
| 18 | 18 | 297 | 39 | 26.7 | 39 | 31.4 | 152.65 | 0.34 | .9929576 | 14.7 | 4 | 10 | 57.06 |
| 19 | 19 | 298 | 40 | 30.0 | 40 | 34.5 | 152.62 | 0.43 | .9929941 | 15.8 | 4 | 7 | 1.16 |
| 20 | 20 | 299 | 41 | 32.5 | 41 | 36,8 | 152.58 | 0.50 | .9930332 | 16.9 | 4 | 3 | 5.24 |
| 21 | 21 | 300 | 42 | 34.2 | 42 | 38.3 | 152.54 | 0.52 | .9930751 | 18.0 | 3 | 59 | 9.34 |
| 22 | 22 | 301 | 43 | 35.0 | 43 | 39.0 | 152.51 | 0.54 | .9931197 | 19.0 | 3 | 55 | 13.42 |
| 23 | 23 | 302 | 44 | 35.1 | 44 | 38.9 | 152.48 | 0.53 | .9931671 | 20.1 | 3 | 51 | 17.50 |
| 24 | 24 | 303 | 45 | 34.5 | 45 | 38.2 | 152.45 | 0.48 | .9932172 | 21.2 | 3 | 47 | 21.59 |
| 25 | 25 | 304 | 46 | 33.2 | 46 | 36.7 | 152.42 | 0.40 | .9932698 | 22.3 | 3 | 43 | 25.68 |
| 26 | 26 | 305 | 47 | 31.2 | 47 | 34.5 | 152.39 | 0.29 | .9933250 | 23.4 | 3 | 39 | 29.78 |
| 27 | 27 | 306 | 48 | 28.5 | 48 | 31.7 | 152.36 | 0.18 | .9933824 | 24.3 | 3 | 35 | 33.86 |
| 28 | 28 | 307 | 49 | 25.1 | 49 | 28.1 | 152.33 | +0.02 | .9934422 | 25.2 | 3 | 31 | 37.96 |
| 29 | 29 | 308 | 50 | 21.0 | 50 | 23.8 | 152.31 | —0.12 | .9935043 | 26.1 | 3 | 27 | 42.05 |
| 30 | 30 | 309 | 51 | 16.1 | 51 | 18.7 | 152.28 | 0.26 | .9935684 | 27.0 | 3 | 23 | 46.14 |
| 31 | 31 | 310 | 52 | 10.4 | 52 | 12.8 | 152.25 | 0.37 | .9936345 | 27.9 | 3 | 19 | 50.23 |
| 32 | 32 | 311 | 53 | 4.0 | 53 | 6.3 | 152.21 | —0.48 | 9.9937023 | 28.6 | 3 | 15 | 54.30 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ' " | ' " | ' " | " | ' " | " | h. m. | m. | d. |
| 1 | 14 59.4 | 15 3.8 | 54 54.3 | +1.22 | 55 10.2 | +1.42 | 19 11.0 | 1.78 | 23.1 |
| 2 | 15 8.8 | 15 14.3 | 55 28.5 | 1.60 | 55 48.7 | 1.76 | 19 55.6 | 1.95 | 24.1 |
| 3 | 15 20.2 | 15 26.5 | 56 10.7 | 1.88 | 56 34.0 | 1.98 | 20 44.5 | 2.14 | 25.1 |
| 4 | 15 33.2 | 15 40.0 | 56 58.4 | 2.07 | 57 23.4 | 2.10 | 21 38.5 | 2.35 | 26.1 |
| 5 | 15 46.9 | 15 53.6 | 57 48.5 | 2.08 | 58 13.1 | 2.02 | 22 37.5 | 2.53 | 27.1 |
| 6 | 16 0.0 | 16 6.0 | 58 36.8 | 1.92 | 58 59.0 | 1.77 | 23 39.9 | 2.61 | 28.1 |
| 7 | 16 11.5 | 16 16.3 | 59 19.1 | 1.57 | 59 36.7 | 1.35 | ☌ | | 29.1 |
| 8 | 16 20.3 | 16 23.4 | 59 51.4 | 1.09 | 60 2.9 | 0.82 | 0 43.0 | 2.58 | 0.5 |
| 9 | 16 25.6 | 16 26.8 | 60 10.9 | +0.52 | 60 15.4 | +0.23 | 1 43.9 | 2.46 | 1.5 |
| 10 | 16 27.1 | 16 26.5 | 60 16.4 | –0.05 | 60 14.1 | –0.32 | 2 41.0 | 2.30 | 2.5 |
| 11 | 16 25.0 | 16 22.8 | 60 8.7 | 0.57 | 60 0.5 | 0.79 | 3 34.2 | 2.15 | 3.5 |
| 12 | 16 19.9 | 16 16.5 | 59 49.9 | 0.97 | 59 37.3 | 1.11 | 4 24.1 | 2.05 | 4.5 |
| 13 | 16 12.7 | 16 8.5 | 59 23.1 | 1.22 | 59 7.8 | 1.31 | 5 12.2 | 2.00 | 5.5 |
| 14 | 16 4.1 | 15 59.6 | 58 51.7 | 1.36 | 58 35.2 | 1.39 | 5 59.9 | 2.01 | 6.5 |
| 15 | 15 55.0 | 15 50.4 | 58 18.4 | 1.40 | 58 1.6 | 1.39 | 6 48.4 | 2.06 | 7.5 |
| 16 | 15 45.9 | 15 41.4 | 57 44.9 | 1.38 | 57 28.4 | 1.37 | 7 38.9 | 2.15 | 8.5 |
| 17 | 15 37.0 | 15 32.7 | 57 12.3 | 1.34 | 56 56.5 | 1.30 | 8 31.7 | 2.25 | 9.5 |
| 18 | 15 28.5 | 15 24.4 | 56 41.0 | 1.27 | 56 25.8 | 1.24 | 9 26.6 | 2.30 | 10.5 |
| 19 | 15 20.4 | 15 16.5 | 56 11.1 | 1.21 | 55 56.8 | 1.17 | 10 22.3 | 2.30 | 11.5 |
| 20 | 15 12.7 | 15 9.1 | 55 42.9 | 1.13 | 55 29.6 | 1.08 | 11 17.2 | 2.24 | 12.5 |
| 21 | 15 5.6 | 15 2.3 | 55 16.9 | 1.03 | 55 4.8 | 0.97 | 12 9.7 | 2.12 | 13.5 |
| 22 | 14 59.2 | 14 56.4 | 54 53.5 | 0.91 | 54 43.0 | 0.83 | 12 58.9 | 1.98 | 14.5 |
| 23 | 14 53.8 | 14 51.5 | 54 33.5 | 0.75 | 54 25.2 | 0.65 | 13 44.5 | 1.84 | 15.5 |
| 24 | 14 49.6 | 14 48.0 | 54 18.1 | 0.53 | 54 12.4 | 0.41 | 14 27.1 | 1.73 | 16.5 |
| 25 | 14 46.9 | 14 46.3 | 54 8.2 | –0.27 | 54 5.8 | –0.12 | 15 7.4 | 1.67 | 17.5 |
| 26 | 14 46.1 | 14 46.5 | 54 5.2 | +0.04 | 54 6.7 | +0.21 | 15 46.5 | 1.63 | 18.5 |
| 27 | 14 47.5 | 14 49.1 | 54 10.3 | 0.39 | 54 16.2 | 0.59 | 16 25.5 | 1.65 | 19.5 |
| 28 | 14 51.4 | 14 54.3 | 54 24.6 | 0.79 | 54 35.4 | 1.00 | 17 5.5 | 1.71 | 20.5 |
| 29 | 14 57.9 | 15 2.2 | 54 48.6 | 1.21 | 55 4.4 | 1.41 | 17 47.7 | 1.83 | 21.5 |
| 30 | 15 7.1 | 15 12.7 | 55 22.6 | 1.61 | 55 43.1 | 1.80 | 18 33.5 | 2.00 | 22.5 |
| 31 | 15 18.9 | 15 25.6 | 56 5.8 | 1.98 | 56 30.4 | 2.13 | 19 23.8 | 22.0 | 23.5 |
| 32 | 15 32.8 | 15 40.3 | 56 56.7 | +2.25 | 57 24.3 | +2.34 | 20 19.2 | 24.0 | 24.5 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### TUESDAY 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 19 53.96 | 1.8172 | S. 7 30 5.7 | 13.754 |
| 1 | 13 21 43.09 | 1.8206 | 7 43 50.4 | 13.737 |
| 2 | 13 23 32.43 | 1.8241 | 7 57 34.1 | 13.718 |
| 3 | 13 25 21.98 | 1.8277 | 8 11 16.7 | 13.699 |
| 4 | 13 27 11.75 | 1.8313 | 8 24 58.0 | 13.679 |
| 5 | 13 29 1.73 | 1.8349 | 8 38 38.1 | 13.658 |
| 6 | 13 30 51.94 | 1.8387 | 8 52 17.0 | 13.636 |
| 7 | 13 32 42.38 | 1.8427 | 9 5 54.5 | 13.614 |
| 8 | 13 34 33.06 | 1.8467 | 9 19 30.7 | 13.591 |
| 9 | 13 36 23.98 | 1.8507 | 9 33 5.4 | 13.566 |
| 10 | 13 38 15.15 | 1.8550 | 9 46 38.6 | 13.541 |
| 11 | 13 40 6.58 | 1.8593 | 10 0 10.3 | 13.515 |
| 12 | 13 41 58.27 | 1.8637 | 10 13 40.5 | 13.488 |
| 13 | 13 43 50.22 | 1.8680 | 10 27 9.0 | 13.460 |
| 14 | 13 45 42.43 | 1.8724 | 10 40 35.8 | 13.432 |
| 15 | 13 47 34.91 | 1.8770 | 10 54 0.8 | 13.402 |
| 16 | 13 49 27.67 | 1.8817 | 11 7 24.0 | 13.371 |
| 17 | 13 51 20.71 | 1.8864 | 11 20 45.4 | 13.339 |
| 18 | 13 53 14.03 | 1.8911 | 11 34 4.8 | 13.307 |
| 19 | 13 55 7.64 | 1.8960 | 11 47 22.2 | 13.274 |
| 20 | 13 57 1.55 | 1.9010 | 12 0 37.6 | 13.239 |
| 21 | 13 58 55.76 | 1.9061 | 12 13 50.9 | 13.204 |
| 22 | 14 0 50.28 | 1.9112 | 12 27 2.1 | 13.167 |
| 23 | 14 2 45.11 | 1.9165 | S.12 40 11.0 | 13.129 |

#### WEDNESDAY 2.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 4 40.26 | 1.9218 | S.12 53 17.6 | 13.091 |
| 1 | 14 6 35.73 | 1.9272 | 13 6 21.9 | 13.051 |
| 2 | 14 8 31.53 | 1.9327 | 13 19 23.7 | 13.010 |
| 3 | 14 10 27.66 | 1.9383 | 13 32 23.1 | 12.969 |
| 4 | 14 12 24.12 | 1.9440 | 13 45 19.9 | 12.926 |
| 5 | 14 14 20.92 | 1.9496 | 13 58 14.2 | 12.882 |
| 6 | 14 16 18.07 | 1.9554 | 14 11 5.8 | 12.837 |
| 7 | 14 18 15.57 | 1.9613 | 14 23 54.6 | 12.791 |
| 8 | 14 20 13.43 | 1.9672 | 14 36 40.7 | 12.743 |
| 9 | 14 22 11.63 | 1.9732 | 14 49 23.9 | 12.695 |
| 10 | 14 24 10.20 | 1.9792 | 15 2 4.1 | 12.645 |
| 11 | 14 26 9.14 | 1.9855 | 15 14 41.3 | 12.594 |
| 12 | 14 28 8.45 | 1.9917 | 15 27 15.4 | 12.542 |
| 13 | 14 30 8.14 | 1.9980 | 15 39 46.3 | 12.489 |
| 14 | 14 32 8.21 | 2.0044 | 15 52 14.1 | 12.434 |
| 15 | 14 34 8.67 | 2.0109 | 16 4 38.5 | 12.379 |
| 16 | 14 36 9.52 | 2.0175 | 16 16 59.5 | 12.322 |
| 17 | 14 38 10.77 | 2.0242 | 16 29 17.1 | 12.264 |
| 18 | 14 40 12.42 | 2.0308 | 16 41 31.2 | 12.204 |
| 19 | 14 42 14.47 | 2.0376 | 16 53 41.6 | 12.143 |
| 20 | 14 44 16.93 | 2.0444 | 17 5 48.4 | 12.081 |
| 21 | 14 46 19.80 | 2.0513 | 17 17 51.4 | 12.018 |
| 22 | 14 48 23.08 | 2.0582 | 17 29 50.6 | 11.953 |
| 23 | 14 50 26.78 | 2.0652 | 17 41 45.8 | 11.887 |
| 24 | 14 52 30.90 | 2.0722 | S.17 53 37.0 | 11.819 |

#### THURSDAY 3.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 52 30.90 | 2.0722 | S.17 53 37.0 | 11.819 |
| 1 | 14 54 35.45 | 2.0794 | 18 5 24.1 | 11.751 |
| 2 | 14 56 40.43 | 2.0867 | 18 17 7.1 | 11.681 |
| 3 | 14 58 45.85 | 2.0940 | 18 28 45.8 | 11.609 |
| 4 | 15 0 51.72 | 2.1014 | 18 40 20.2 | 11.536 |
| 5 | 15 2 58.03 | 2.1089 | 18 51 50.2 | 11.462 |
| 6 | 15 5 4.78 | 2.1162 | 19 3 15.7 | 11.387 |
| 7 | 15 7 11.98 | 2.1238 | 19 14 36.6 | 11.309 |
| 8 | 15 9 19.63 | 2.1313 | 19 25 52.8 | 11.231 |
| 9 | 15 11 27.73 | 2.1388 | 19 37 4.3 | 11.150 |
| 10 | 15 13 36.29 | 2.1466 | 19 48 10.9 | 11.069 |
| 11 | 15 15 45.31 | 2.1542 | 19 59 12.5 | 10.985 |
| 12 | 15 17 54.80 | 2.1621 | 20 10 9.1 | 10.901 |
| 13 | 15 20 4.76 | 2.1699 | 20 21 0.6 | 10.814 |
| 14 | 15 22 15.19 | 2.1777 | 20 31 46.8 | 10.727 |
| 15 | 15 24 26.09 | 2.1857 | 20 42 27.8 | 10.637 |
| 16 | 15 26 37.47 | 2.1937 | 20 53 3.3 | 10.546 |
| 17 | 15 28 49.33 | 2.2017 | 21 3 33.4 | 10.454 |
| 18 | 15 31 1.67 | 2.2097 | 21 13 57.8 | 10.360 |
| 19 | 15 33 14.49 | 2.2177 | 21 24 16.5 | 10.264 |
| 20 | 15 35 27.79 | 2.2257 | 21 34 29.5 | 10.167 |
| 21 | 15 37 41.57 | 2.2337 | 21 44 36.6 | 10.068 |
| 22 | 15 39 55.84 | 2.2419 | 21 54 37.7 | 9.968 |
| 23 | 15 42 10.61 | 2.2502 | S.22 4 32.7 | 9.866 |

#### FRIDAY 4.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 44 25.87 | 2.2584 | S.22 14 21.6 | 9.762 |
| 1 | 15 46 41.62 | 2.2666 | 22 24 4.2 | 9.656 |
| 2 | 15 48 57.86 | 2.2747 | 22 33 40.4 | 9.549 |
| 3 | 15 51 14.59 | 2.2829 | 22 43 10.1 | 9.440 |
| 4 | 15 53 31.81 | 2.2911 | 22 52 33.2 | 9.330 |
| 5 | 15 55 49.52 | 2.2992 | 23 1 49.7 | 9.218 |
| 6 | 15 58 7.72 | 2.3074 | 23 10 59.4 | 9.104 |
| 7 | 16 0 26.42 | 2.3157 | 23 20 2.2 | 8.989 |
| 8 | 16 2 45.62 | 2.3241 | 23 28 58.0 | 8.871 |
| 9 | 16 5 5.32 | 2.3324 | 23 37 46.8 | 8.753 |
| 10 | 16 7 25.52 | 2.3407 | 23 46 28.4 | 8.632 |
| 11 | 16 9 46.21 | 2.3489 | 23 55 2.7 | 8.510 |
| 12 | 16 12 7.39 | 2.3571 | 24 3 29.6 | 8.386 |
| 13 | 16 14 29.06 | 2.3652 | 24 11 49.0 | 8.261 |
| 14 | 16 16 51.22 | 2.3733 | 24 20 0.9 | 8.133 |
| 15 | 16 19 13.88 | 2.3817 | 24 28 5.1 | 8.005 |
| 16 | 16 21 37.03 | 2.3898 | 24 36 1.4 | 7.874 |
| 17 | 16 24 0.67 | 2.3980 | 24 43 49.9 | 7.741 |
| 18 | 16 26 24.79 | 2.4060 | 24 51 30.4 | 7.607 |
| 19 | 16 28 49.39 | 2.4140 | 24 59 2.8 | 7.471 |
| 20 | 16 31 14.47 | 2.4219 | 25 6 26.9 | 7.333 |
| 21 | 16 33 40.03 | 2.4299 | 25 13 42.8 | 7.194 |
| 22 | 16 36 6.07 | 2.4377 | 25 20 50.3 | 7.053 |
| 23 | 16 38 32.58 | 2.4456 | 25 27 49.2 | 6.910 |
| 24 | 16 40 59.55 | 2.4534 | S.25 34 39.5 | 6.766 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### SATURDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 40 59.55 | 2.4534 | S.25 34 39.5 | 6.766 |
| 1 | 16 43 26.99 | 2.4612 | 25 41 21.1 | 6.620 |
| 2 | 16 45 54.89 | 2.4688 | 25 47 53.9 | 6.472 |
| 3 | 16 48 23.25 | 2.4764 | 25 54 17.8 | 6.323 |
| 4 | 16 50 52.06 | 2.4839 | 26 0 32.7 | 6.172 |
| 5 | 16 53 21.32 | 2.4913 | 26 6 38.4 | 6.019 |
| 6 | 16 55 51.03 | 2.4987 | 26 12 34.9 | 5.865 |
| 7 | 16 58 21.18 | 2.5060 | 26 18 22.1 | 5.709 |
| 8 | 17 0 51.77 | 2.5132 | 26 24 0.0 | 5.552 |
| 9 | 17 3 22.79 | 2.5202 | 26 29 28.4 | 5.393 |
| 10 | 17 5 54.22 | 2.5272 | 26 34 47.2 | 5.233 |
| 11 | 17 8 26.07 | 2.5341 | 26 39 56.3 | 5.071 |
| 12 | 17 10 58.33 | 2.5409 | 26 44 55.7 | 4.907 |
| 13 | 17 13 31.00 | 2.5477 | 26 49 45.2 | 4.742 |
| 14 | 17 16 4.07 | 2.5543 | 26 54 24.8 | 4.576 |
| 15 | 17 18 37.54 | 2.5609 | 26 58 54.3 | 4.408 |
| 16 | 17 21 11.39 | 2.5673 | 27 3 13.7 | 4.238 |
| 17 | 17 23 45.62 | 2.5736 | 27 7 22.9 | 4.067 |
| 18 | 17 26 20.22 | 2.5797 | 27 11 21.8 | 3.896 |
| 19 | 17 28 55.18 | 2.5856 | 27 15 10.3 | 3.722 |
| 20 | 17 31 30.50 | 2.5914 | 27 18 48.4 | 3.547 |
| 21 | 17 34 6.17 | 2.5972 | 27 22 16.0 | 3.371 |
| 22 | 17 36 42.18 | 2.6027 | 27 25 32.9 | 3.193 |
| 23 | 17 39 18.51 | 2.6082 | S.27 28 39.1 | 3.014 |

#### SUNDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 41 55.16 | 2.6134 | S.27 31 34.6 | 2.834 |
| 1 | 17 44 32.13 | 2.6186 | 27 34 19.3 | 2.653 |
| 2 | 17 47 9.40 | 2.6235 | 27 36 53.0 | 2.471 |
| 3 | 17 49 46.97 | 2.6284 | 27 39 15.8 | 2.288 |
| 4 | 17 52 24.82 | 2.6330 | 27 41 27.5 | 2.103 |
| 5 | 17 55 2.95 | 2.6376 | 27 43 28.2 | 1.918 |
| 6 | 17 57 41.35 | 2.6420 | 27 45 17.7 | 1.732 |
| 7 | 18 0 20.00 | 2.6461 | 27 46 56.0 | 1.544 |
| 8 | 18 2 58.90 | 2.6502 | 27 48 23.0 | 1.356 |
| 9 | 18 5 38.04 | 2.6541 | 27 49 38.7 | 1.167 |
| 10 | 18 8 17.40 | 2.6577 | 27 50 43.1 | 0.977 |
| 11 | 18 10 56.97 | 2.6612 | 27 51 36.0 | 0.786 |
| 12 | 18 13 36.74 | 2.6644 | 27 52 17.4 | 0.594 |
| 13 | 18 16 16.71 | 2.6675 | 27 52 47.3 | 0.402 |
| 14 | 18 18 56.86 | 2.6704 | 27 53 5.7 | 0.209 |
| 15 | 18 21 37.18 | 2.6732 | 27 53 12.5 | 0.016 |
| 16 | 18 24 17.66 | 2.6757 | 27 53 7.6 | 0.178 |
| 17 | 18 26 58.30 | 2.6782 | 27 52 51.1 | 0.372 |
| 18 | 18 29 39.07 | 2.6804 | 27 52 22.9 | 0.567 |
| 19 | 18 32 19.97 | 2.6825 | 27 51 43.0 | 0.763 |
| 20 | 18 35 0.99 | 2.6843 | 27 50 51.3 | 0.959 |
| 21 | 18 37 42.11 | 2.6859 | 27 49 47.9 | 1.155 |
| 22 | 18 40 23.32 | 2.6873 | 27 48 32.7 | 1.351 |
| 23 | 18 43 4.60 | 2.6886 | 27 47 5.7 | 1.548 |
| 24 | 18 45 45.95 | 2.6897 | S.27 45 26.9 | 1.745 |

#### MONDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 45 45.95 | 2.6897 | S.27 45 26.9 | 1.745 |
| 1 | 18 48 27.36 | 2.6906 | 27 43 36.3 | 1.942 |
| 2 | 18 51 8.82 | 2.6913 | 27 41 33.8 | 2.140 |
| 3 | 18 53 50.31 | 2.6917 | 27 39 19.4 | 2.338 |
| 4 | 18 56 31.83 | 2.6919 | 27 36 53.2 | 2.536 |
| 5 | 18 59 13.36 | 2.6920 | 27 34 15.2 | 2.733 |
| 6 | 19 1 54.89 | 2.6919 | 27 31 25.3 | 2.930 |
| 7 | 19 4 36.41 | 2.6917 | 27 28 23.6 | 3.127 |
| 8 | 19 7 17.91 | 2.6912 | 27 25 10.1 | 3.324 |
| 9 | 19 9 59.37 | 2.6906 | 27 21 44.7 | 3.521 |
| 10 | 19 12 40.78 | 2.6897 | 27 18 7.5 | 3.717 |
| 11 | 19 15 22.13 | 2.6886 | 27 14 18.6 | 3.913 |
| 12 | 19 18 3.41 | 2.6873 | 27 10 17.9 | 4.109 |
| 13 | 19 20 44.61 | 2.6859 | 27 6 5.5 | 4.304 |
| 14 | 19 23 25.73 | 2.6843 | 27 1 41.4 | 4.499 |
| 15 | 19 26 6.75 | 2.6826 | 26 57 5.6 | 4.693 |
| 16 | 19 28 47.66 | 2.6807 | 26 52 18.1 | 4.887 |
| 17 | 19 31 28.44 | 2.6784 | 26 47 19.1 | 5.080 |
| 18 | 19 34 9.09 | 2.6762 | 26 42 8.5 | 5.273 |
| 19 | 19 36 49.60 | 2.6737 | 26 36 46.4 | 5.464 |
| 20 | 19 39 29.95 | 2.6712 | 26 31 12.8 | 5.655 |
| 21 | 19 42 10.14 | 2.6684 | 26 25 27.7 | 5.845 |
| 22 | 19 44 50.16 | 2.6655 | 26 19 31.3 | 6.034 |
| 23 | 19 47 30.00 | 2.6624 | S.26 13 23.5 | 6.223 |

#### TUESDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 50 9.65 | 2.6592 | S.26 7 4.5 | 6.411 |
| 1 | 19 52 49.10 | 2.6557 | 26 0 34.2 | 6.597 |
| 2 | 19 55 28.34 | 2.6522 | 25 53 52.8 | 6.783 |
| 3 | 19 58 7.36 | 2.6484 | 25 47 0.3 | 6.968 |
| 4 | 20 0 46.15 | 2.6445 | 25 39 56.7 | 7.151 |
| 5 | 20 3 24.70 | 2.6404 | 25 32 42.1 | 7.333 |
| 6 | 20 6 3.00 | 2.6362 | 25 25 16.7 | 7.514 |
| 7 | 20 8 41.05 | 2.6320 | 25 17 40.4 | 7.694 |
| 8 | 20 11 18.84 | 2.6276 | 25 9 53.4 | 7.872 |
| 9 | 20 13 56.36 | 2.6230 | 25 1 55.7 | 8.050 |
| 10 | 20 16 33.61 | 2.6183 | 24 53 47.4 | 8.226 |
| 11 | 20 19 10.58 | 2.6137 | 24 45 28.6 | 8.400 |
| 12 | 20 21 47.27 | 2.6088 | 24 36 59.4 | 8.573 |
| 13 | 20 24 23.65 | 2.6037 | 24 28 19.8 | 8.745 |
| 14 | 20 26 59.73 | 2.5987 | 24 19 29.9 | 8.915 |
| 15 | 20 29 35.50 | 2.5935 | 24 10 29.9 | 9.084 |
| 16 | 20 32 10.96 | 2.5883 | 24 1 19.8 | 9.252 |
| 17 | 20 34 46.10 | 2.5829 | 23 51 59.7 | 9.418 |
| 18 | 20 37 20.90 | 2.5774 | 23 42 29.7 | 9.582 |
| 19 | 20 39 55.37 | 2.5718 | 23 32 49.9 | 9.744 |
| 20 | 20 42 29.51 | 2.5662 | 23 23 0.4 | 9.905 |
| 21 | 20 45 3.31 | 2.5604 | 23 13 1.3 | 10.064 |
| 22 | 20 47 36.76 | 2.5546 | 23 2 52.7 | 10.222 |
| 23 | 20 50 9.86 | 2.5487 | 22 52 34.6 | 10.378 |
| 24 | 20 52 42.61 | 2.5428 | S.22 42 7.2 | 10.533 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | WEDNESDAY 9. | | | | | FRIDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 52 42.61 | 2.5428 | S.22 42 7.2 | 10.533 | 0 | 22 47 30.95 | 2.2476 | S.11 54 45.7 | 15.689 |
| 1 | 20 55 15.00 | 2.5368 | 22 31 30.6 | 10.685 | 1 | 22 49 45.64 | 2.2423 | 11 39 2.5 | 15.749 |
| 2 | 20 57 47.03 | 2.5307 | 22 20 44.9 | 10.836 | 2 | 22 52 0.02 | 2.2371 | 11 23 15.8 | 15.806 |
| 3 | 21 0 18.69 | 2.5246 | 22 9 50.3 | 10.984 | 3 | 22 54 14.09 | 2.2320 | 11 7 25.7 | 15.862 |
| 4 | 21 2 49.98 | 2.5184 | 21 58 46.8 | 11.131 | 4 | 22 56 27.86 | 2.2270 | 10 51 32.3 | 15.916 |
| 5 | 21 5 20.89 | 2.5122 | 21 47 34.5 | 11.277 | 5 | 22 58 41.33 | 2.2221 | 10 35 35.7 | 15.969 |
| 6 | 21 7 51.43 | 2.5060 | 21 36 13.6 | 11.420 | 6 | 23 0 54.50 | 2.2171 | 10 19 36.1 | 16.019 |
| 7 | 21 10 21.59 | 2.4997 | 21 24 44.1 | 11.562 | 7 | 23 3 7.39 | 2.2124 | 10 3 33.5 | 16.068 |
| 8 | 21 12 51.37 | 2.4933 | 21 13 6.2 | 11.701 | 8 | 23 5 19.99 | 2.2077 | 9 47 28.0 | 16.114 |
| 9 | 21 15 20.77 | 2.4870 | 21 1 19.9 | 11.839 | 9 | 23 7 32.32 | 2.2031 | 9 31 19.7 | 16.159 |
| 10 | 21 17 49.80 | 2.4806 | 20 49 25.4 | 11.975 | 10 | 23 9 44.37 | 2.1986 | 9 15 8.8 | 16.203 |
| 11 | 21 20 18.45 | 2.4742 | 20 37 22.8 | 12.110 | 11 | 23 11 56.15 | 2.1941 | 8 58 55.4 | 16.244 |
| 12 | 21 22 46.71 | 2.4677 | 20 25 12.2 | 12.242 | 12 | 23 14 7.66 | 2.1897 | 8 42 39.6 | 16.283 |
| 13 | 21 25 14.58 | 2.4612 | 20 12 53.8 | 12.372 | 13 | 23 16 18.91 | 2.1854 | 8 26 21.4 | 16.321 |
| 14 | 21 27 42.06 | 2.4547 | 20 0 27.6 | 12.500 | 14 | 23 18 29.90 | 2.1811 | 8 10 1.0 | 16.357 |
| 15 | 21 30 9.15 | 2.4482 | 19 47 53.7 | 12.627 | 15 | 23 20 40.64 | 2.1770 | 7 53 38.5 | 16.392 |
| 16 | 21 32 35.85 | 2.4417 | 19 35 12.3 | 12.751 | 16 | 23 22 51.14 | 2.1730 | 7 37 14.0 | 16.424 |
| 17 | 21 35 2.16 | 2.4352 | 19 22 23.5 | 12.874 | 17 | 23 25 1.40 | 2.1691 | 7 20 47.6 | 16.455 |
| 18 | 21 37 28.08 | 2.4287 | 19 9 27.4 | 12.994 | 18 | 23 27 11.43 | 2.1652 | 7 4 19.4 | 16.484 |
| 19 | 21 39 53.61 | 2.4222 | 18 56 24.2 | 13.113 | 19 | 23 29 21.23 | 2.1614 | 6 47 49.5 | 16.511 |
| 20 | 21 42 18.75 | 2.4157 | 18 43 13.9 | 13.229 | 20 | 23 31 30.80 | 2.1577 | 6 31 18.0 | 16.537 |
| 21 | 21 44 43.50 | 2.4092 | 18 29 56.7 | 13.344 | 21 | 23 33 40.15 | 2.1540 | 6 14 45.0 | 16.561 |
| 22 | 21 47 7.86 | 2.4027 | 18 16 32.6 | 13.457 | 22 | 23 35 49.29 | 2.1506 | 5 58 10.6 | 16.583 |
| 23 | 21 49 31.84 | 2.3962 | S.18 3 1.8 | 13.567 | 23 | 23 37 58.22 | 2.1472 | S. 5 41 35.0 | 16.604 |
| | THURSDAY 10. | | | | | SATURDAY 12. | | | |
| 0 | 21 51 55.43 | 2.3898 | S.17 49 24.4 | 13.676 | 0 | 23 40 6.95 | 2.1438 | S. 5 24 58.2 | 16.623 |
| 1 | 21 54 18.63 | 2.3835 | 17 35 40.6 | 13.782 | 1 | 23 42 15.48 | 2.1406 | 5 8 20.3 | 16.640 |
| 2 | 21 56 41.45 | 2.3772 | 17 21 50.5 | 13.887 | 2 | 23 44 23.81 | 2.1373 | 4 51 41.3 | 16.656 |
| 3 | 21 59 3.89 | 2.3708 | 17 7 54.1 | 13.989 | 3 | 23 46 31.96 | 2.1343 | 4 35 1.5 | 16.670 |
| 4 | 22 1 25.95 | 2.3645 | 16 53 51.7 | 14.090 | 4 | 23 48 39.93 | 2.1313 | 4 18 20.9 | 16.683 |
| 5 | 22 3 47.63 | 2.3582 | 16 39 43.3 | 14.189 | 5 | 23 50 47.72 | 2.1284 | 4 1 39.5 | 16.694 |
| 6 | 22 6 8.93 | 2.3519 | 16 25 29.0 | 14.285 | 6 | 23 52 55.34 | 2.1256 | 3 44 57.5 | 16.703 |
| 7 | 22 8 29.85 | 2.3456 | 16 11 9.0 | 14.380 | 7 | 23 55 2.79 | 2.1228 | 3 28 15.0 | 16.711 |
| 8 | 22 10 50.40 | 2.3394 | 15 56 43.4 | 14.473 | 8 | 23 57 10.08 | 2.1202 | 3 11 32.1 | 16.717 |
| 9 | 22 13 10.58 | 2.3332 | 15 42 12.3 | 14.563 | 9 | 23 59 17.22 | 2.1177 | 2 54 48.9 | 16.722 |
| 10 | 22 15 30.40 | 2.3272 | 15 27 35.8 | 14.652 | 10 | 0 1 24.21 | 2.1152 | 2 38 5.5 | 16.725 |
| 11 | 22 17 49.86 | 2.3212 | 15 12 54.0 | 14.738 | 11 | 0 3 31.06 | 2.1129 | 2 21 21.9 | 16.726 |
| 12 | 22 20 8.95 | 2.3152 | 14 58 7.1 | 14.823 | 12 | 0 5 37.78 | 2.1107 | 2 4 38.3 | 16.726 |
| 13 | 22 22 27.68 | 2.3092 | 14 43 15.2 | 14.906 | 13 | 0 7 44.35 | 2.1086 | 1 47 54.8 | 16.725 |
| 14 | 22 24 46.05 | 2.3032 | 14 28 18.4 | 14.987 | 14 | 0 9 50.79 | 2.1065 | 1 31 11.4 | 16.722 |
| 15 | 22 27 4.07 | 2.2974 | 14 13 16.8 | 15.066 | 15 | 0 11 57.12 | 2.1046 | 1 14 28.2 | 16.717 |
| 16 | 22 29 21.74 | 2.2916 | 13 58 10.5 | 15.142 | 16 | 0 14 3.34 | 2.1027 | 0 57 45.3 | 16.712 |
| 17 | 22 31 39.07 | 2.2858 | 13 42 59.6 | 15.217 | 17 | 0 16 9.45 | 2.1010 | 0 41 2.8 | 16.704 |
| 18 | 22 33 56.05 | 2.2801 | 13 27 44.3 | 15.291 | 18 | 0 18 15.46 | 2.0993 | 0 24 20.8 | 16.696 |
| 19 | 22 36 12.69 | 2.2745 | 13 12 24.7 | 15.362 | 19 | 0 20 21.37 | 2.0977 | S. 0 7 39.4 | 16.684 |
| 20 | 22 38 28.99 | 2.2689 | 12 57 0.9 | 15.431 | 20 | 0 22 27.18 | 2.0961 | N. 0 9 1.3 | 16.672 |
| 21 | 22 40 44.96 | 2.2634 | 12 41 32.9 | 15.499 | 21 | 0 24 32.90 | 2.0947 | 0 25 41.2 | 16.658 |
| 22 | 22 43 0.61 | 2.2581 | 12 26 1.0 | 15.564 | 22 | 0 26 38.54 | 2.0933 | 0 42 20.3 | 16.643 |
| 23 | 22 45 15.94 | 2.2528 | 12 10 25.2 | 15.627 | 23 | 0 28 44.09 | 2.0921 | 0 58 58.4 | 16.627 |
| 24 | 22 47 30.95 | 2.2476 | S.11 54 45.7 | 15.689 | 24 | 0 30 49.57 | 2.0909 | N. 1 15 35.5 | 16.609 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 30 49.57 | 2.0909 | N. 1 15 35.5 | 16.609 |
| 1 | 0 32 54.98 | 2.0898 | 1 32 11.5 | 16.590 |
| 2 | 0 35 0.34 | 2.0889 | 1 48 46.3 | 16.569 |
| 3 | 0 37 5.65 | 2.0880 | 2 5 19.8 | 16.547 |
| 4 | 0 39 10.91 | 2.0872 | 2 21 51.9 | 16.524 |
| 5 | 0 41 16.12 | 2.0865 | 2 38 22.7 | 16.500 |
| 6 | 0 43 21.29 | 2.0859 | 2 54 52.0 | 16.475 |
| 7 | 0 45 26.43 | 2.0854 | 3 11 19.7 | 16.448 |
| 8 | 0 47 31.54 | 2.0849 | 3 27 45.7 | 16.418 |
| 9 | 0 49 36.63 | 2.0846 | 3 44 9.9 | 16.387 |
| 10 | 0 51 41.70 | 2.0844 | 4 0 32.1 | 16.355 |
| 11 | 0 53 46.75 | 2.0841 | 4 16 52.4 | 16.322 |
| 12 | 0 55 51.79 | 2.0840 | 4 33 10.7 | 16.288 |
| 13 | 0 57 56.83 | 2.0841 | 4 49 27.0 | 16.253 |
| 14 | 1 0 1.88 | 2.0842 | 5 5 41.1 | 16.216 |
| 15 | 1 2 6.94 | 2.0844 | 5 21 53.0 | 16.177 |
| 16 | 1 4 12.01 | 2.0847 | 5 38 2.5 | 16.137 |
| 17 | 1 6 17.10 | 2.0850 | 5 54 9.5 | 16.096 |
| 18 | 1 8 22.21 | 2.0854 | 6 10 14.0 | 16.054 |
| 19 | 1 10 27.35 | 2.0859 | 6 26 16.0 | 16.011 |
| 20 | 1 12 32.52 | 2.0865 | 6 42 15.4 | 15.966 |
| 21 | 1 14 37.74 | 2.0873 | 6 58 12.0 | 15.920 |
| 22 | 1 16 43.00 | 2.0881 | 7 14 5.8 | 15.872 |
| 23 | 1 18 48.30 | 2.0888 | N. 7 29 56.7 | 15.823 |

### MONDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 1 20 53.65 | 2.0897 | N. 7 45 44.6 | 15.773 |
| 1 | 1 22 59.06 | 2.0907 | 8 1 29.5 | 15.722 |
| 2 | 1 25 4.54 | 2.0919 | 8 17 11.3 | 15.670 |
| 3 | 1 27 10.09 | 2.0931 | 8 32 49.9 | 15.616 |
| 4 | 1 29 15.71 | 2.0943 | 8 48 25.3 | 15.561 |
| 5 | 1 31 21.41 | 2.0957 | 9 3 57.3 | 15.505 |
| 6 | 1 33 27.19 | 2.0971 | 9 19 25.9 | 15.447 |
| 7 | 1 35 33.05 | 2.0986 | 9 34 51.0 | 15.388 |
| 8 | 1 37 39.01 | 2.1001 | 9 50 12.5 | 15.328 |
| 9 | 1 39 45.06 | 2.1017 | 10 5 30.4 | 15.267 |
| 10 | 1 41 51.21 | 2.1034 | 10 20 44.6 | 15.204 |
| 11 | 1 43 57.47 | 2.1052 | 10 35 55.0 | 15.140 |
| 12 | 1 46 3.84 | 2.1071 | 10 51 1.5 | 15.075 |
| 13 | 1 48 10.32 | 2.1090 | 11 6 4.1 | 15.009 |
| 14 | 1 50 16.92 | 2.1110 | 11 21 2.7 | 14.942 |
| 15 | 1 52 23.64 | 2.1130 | 11 35 57.2 | 14.873 |
| 16 | 1 54 30.48 | 2.1151 | 11 50 47.5 | 14.803 |
| 17 | 1 56 37.45 | 2.1172 | 12 5 33.6 | 14.732 |
| 18 | 1 58 44.55 | 2.1195 | 12 20 15.4 | 14.660 |
| 19 | 2 0 51.79 | 2.1218 | 12 34 52.8 | 14.586 |
| 20 | 2 2 59.17 | 2.1242 | 12 49 25.8 | 14.512 |
| 21 | 2 5 6.70 | 2.1267 | 13 3 54.2 | 14.436 |
| 22 | 2 7 14.38 | 2.1292 | 13 18 18.0 | 14.357 |
| 23 | 2 9 22.21 | 2.1318 | 13 32 37.2 | 14.280 |
| 24 | 2 11 30.20 | 2.1345 | N.13 46 51.7 | 14.202 |

### TUESDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 11 30.20 | 2.1345 | N.13 46 51.7 | 14.202 |
| 1 | 2 13 38.35 | 2.1372 | 14 1 1.4 | 14.121 |
| 2 | 2 15 46.66 | 2.1399 | 14 15 6.1 | 14.038 |
| 3 | 2 17 55.14 | 2.1427 | 14 29 5.9 | 13.955 |
| 4 | 2 20 3.79 | 2.1456 | 14 43 0.7 | 13.871 |
| 5 | 2 22 12.61 | 2.1485 | 14 56 50.4 | 13.785 |
| 6 | 2 24 21.61 | 2.1515 | 15 10 34.9 | 13.698 |
| 7 | 2 26 30.79 | 2.1545 | 15 24 14.2 | 13.611 |
| 8 | 2 28 40.15 | 2.1576 | 15 37 48.2 | 13.522 |
| 9 | 2 30 49.70 | 2.1607 | 15 51 16.8 | 13.432 |
| 10 | 2 32 59.44 | 2.1639 | 16 4 39.9 | 13.340 |
| 11 | 2 35 9.37 | 2.1671 | 16 17 57.6 | 13.248 |
| 12 | 2 37 19.48 | 2.1704 | 16 31 9.7 | 13.154 |
| 13 | 2 39 29.79 | 2.1737 | 16 44 16.1 | 13.059 |
| 14 | 2 41 40.30 | 2.1770 | 16 57 16.8 | 12.963 |
| 15 | 2 43 51.02 | 2.1803 | 17 10 11.7 | 12.867 |
| 16 | 2 46 1.94 | 2.1837 | 17 23 0.8 | 12.769 |
| 17 | 2 48 13.07 | 2.1872 | 17 35 43.9 | 12.668 |
| 18 | 2 50 24.41 | 2.1907 | 17 48 21.0 | 12.567 |
| 19 | 2 52 35.96 | 2.1941 | 18 0 52.1 | 12.467 |
| 20 | 2 54 47.72 | 2.1977 | 18 13 17.1 | 12.364 |
| 21 | 2 56 59.69 | 2.2012 | 18 25 35.8 | 12.259 |
| 22 | 2 59 11.87 | 2.2048 | 18 37 48.2 | 12.154 |
| 23 | 3 1 24.26 | 2.2083 | N.18 49 54.3 | 12.048 |

### WEDNESDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 3 36.88 | 2.2122 | N.19 1 54.0 | 11.941 |
| 1 | 3 5 49.72 | 2.2158 | 19 13 47.2 | 11.832 |
| 2 | 3 8 2.78 | 2.2195 | 19 25 33.9 | 11.722 |
| 3 | 3 10 16.06 | 2.2232 | 19 37 14.0 | 11.612 |
| 4 | 3 12 29.57 | 2.2268 | 19 48 47.5 | 11.502 |
| 5 | 3 14 43.30 | 2.2305 | 20 0 14.3 | 11.390 |
| 6 | 3 16 57.25 | 2.2341 | 20 11 34.3 | 11.276 |
| 7 | 3 19 11.43 | 2.2381 | 20 22 47.4 | 11.161 |
| 8 | 3 21 25.84 | 2.2419 | 20 33 53.6 | 11.045 |
| 9 | 3 23 40.47 | 2.2457 | 20 44 52.8 | 10.927 |
| 10 | 3 25 55.33 | 2.2496 | 20 55 44.9 | 10.809 |
| 11 | 3 28 10.42 | 2.2534 | 21 6 29.9 | 10.690 |
| 12 | 3 30 25.74 | 2.2572 | 21 17 7.7 | 10.570 |
| 13 | 3 32 41.29 | 2.2610 | 21 27 38.3 | 10.449 |
| 14 | 3 34 57.06 | 2.2648 | 21 38 1.6 | 10.327 |
| 15 | 3 37 13.05 | 2.2686 | 21 48 17.5 | 10.203 |
| 16 | 3 39 29.27 | 2.2723 | 21 58 26.0 | 10.079 |
| 17 | 3 41 45.72 | 2.2760 | 22 8 27.0 | 9.954 |
| 18 | 3 44 2.39 | 2.2797 | 22 18 20.5 | 9.828 |
| 19 | 3 46 19.29 | 2.2835 | 22 28 6.4 | 9.702 |
| 20 | 3 48 36.41 | 2.2872 | 22 37 44.6 | 9.574 |
| 21 | 3 50 53.76 | 2.2909 | 22 47 15.1 | 9.444 |
| 22 | 3 53 11.32 | 2.2945 | 22 56 37.8 | 9.314 |
| 23 | 3 55 29.10 | 2.2982 | 23 5 52.7 | 9.183 |
| 24 | 3 57 47.10 | 2.3018 | N.23 14 59.7 | 9.051 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | THURSDAY 17. | | | | | SATURDAY 19. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 57 47.10 | 2.3018 | N.23 14 59.7 | 9.051 | 0 | 5 51 24.77 | 2.4024 | N.27 43 16.1 | 1.925 |
| 1 | 4 0 5.32 | 2.3055 | 23 23 58.8 | 8.918 | 1 | 5 53 48.92 | 2.4023 | 27 45 6.8 | 1.767 |
| 2 | 4 2 23.76 | 2.3091 | 23 32 49.9 | 8.785 | 2 | 5 56 13.05 | 2.4020 | 27 46 48.1 | 1.610 |
| 3 | 4 4 42.40 | 2.3126 | 23 41 32.9 | 8.650 | 3 | 5 58 37.16 | 2.4016 | 27 48 20.0 | 1.454 |
| 4 | 4 7 1.25 | 2.3159 | 23 50 7.8 | 8.514 | 4 | 6 1 1.24 | 2.4011 | 27 49 42.6 | 1.297 |
| 5 | 4 9 20.31 | 2.3194 | 23 58 34.6 | 8.378 | 5 | 6 3 25.29 | 2.4005 | 27 50 55.7 | 1.140 |
| 6 | 4 11 39.58 | 2.3228 | 24 6 53.1 | 8.240 | 6 | 6 5 49.30 | 2.3997 | 27 51 59.3 | 0.982 |
| 7 | 4 13 59.05 | 2.3262 | 24 15 3.3 | 8.102 | 7 | 6 8 13.26 | 2.3989 | 27 52 53.5 | 0.825 |
| 8 | 4 16 18.72 | 2.3295 | 24 23 5.3 | 7.963 | 8 | 6 10 37.17 | 2.3980 | 27 53 38.3 | 0.669 |
| 9 | 4 18 38.59 | 2.3328 | 24 30 58.9 | 7.823 | 9 | 6 13 1.02 | 2.3969 | 27 54 13.8 | 0.513 |
| 10 | 4 20 58.66 | 2.3361 | 24 38 44.1 | 7.683 | 10 | 6 15 24.81 | 2.3957 | 27 54 39.9 | 0.357 |
| 11 | 4 23 18.92 | 2.3393 | 24 46 20.9 | 7.542 | 11 | 6 17 48.52 | 2.3945 | 27 54 56.6 | 0.201 |
| 12 | 4 25 39.37 | 2.3424 | 24 53 49.2 | 7.400 | 12 | 6 20 12.15 | 2.3931 | 27 55 4.0 | 0.046 |
| 13 | 4 28 0.01 | 2.3455 | 25 1 8.9 | 7.257 | 13 | 6 22 35.69 | 2.3916 | 27 55 2.1 | 0.109 |
| 14 | 4 30 20.83 | 2.3485 | 25 8 20.0 | 7.113 | 14 | 6 24 59.14 | 2.3900 | 27 54 50.9 | 0.264 |
| 15 | 4 32 41.83 | 2.3514 | 25 15 22.5 | 6.969 | 15 | 6 27 22.49 | 2.3882 | 27 54 30.3 | 0.420 |
| 16 | 4 35 3.00 | 2.3542 | 25 22 16.3 | 6.824 | 16 | 6 29 45.73 | 2.3864 | 27 54 0.4 | 0.575 |
| 17 | 4 37 24.34 | 2.3570 | 25 29 1.4 | 6.678 | 17 | 6 32 8.86 | 2.3845 | 27 53 21.2 | 0.729 |
| 18 | 4 39 45.84 | 2.3597 | 25 35 37.7 | 6.532 | 18 | 6 34 31.87 | 2.3824 | 27 52 32.8 | 0.883 |
| 19 | 4 42 7.51 | 2.3625 | 25 42 5.2 | 6.385 | 19 | 6 36 54.75 | 2.3802 | 27 51 35.2 | 1.036 |
| 20 | 4 44 29.34 | 2.3652 | 25 48 23.9 | 6.237 | 20 | 6 39 17.49 | 2.3778 | 27 50 28.5 | 1.188 |
| 21 | 4 46 51.33 | 2.3677 | 25 54 33.7 | 6.089 | 21 | 6 41 40.09 | 2.3754 | 27 49 12.7 | 1.339 |
| 22 | 4 49 13.47 | 2.3702 | 26 0 34.6 | 5.940 | 22 | 6 44 2.55 | 2.3730 | 27 47 47.8 | 1.490 |
| 23 | 4 51 35.76 | 2.3727 | N.26 6 26.5 | 5.790 | 23 | 6 46 24.86 | 2.3705 | N.27 46 13.7 | 1.642 |
| | FRIDAY 18. | | | | | SUNDAY 20. | | | |
| 0 | 4 53 58.19 | 2.3750 | N.26 12 9.4 | 5.639 | 0 | 6 48 47.01 | 2.3678 | N.27 44 30.6 | 1.793 |
| 1 | 4 56 20.75 | 2.3771 | 26 17 43.2 | 5.488 | 1 | 6 51 8.99 | 2.3649 | 27 42 38.4 | 1.944 |
| 2 | 4 58 43.44 | 2.3792 | 26 23 8.0 | 5.337 | 2 | 6 53 30.80 | 2.3620 | 27 40 37.2 | 2.094 |
| 3 | 5 1 6.26 | 2.3813 | 26 28 23.8 | 5.186 | 3 | 6 55 52.43 | 2.3590 | 27 38 27.0 | 2.244 |
| 4 | 5 3 29.20 | 2.3833 | 26 33 30.5 | 5.035 | 4 | 6 58 13.88 | 2.3559 | 27 36 7.9 | 2.392 |
| 5 | 5 5 52.26 | 2.3852 | 26 38 28.1 | 4.883 | 5 | 7 0 35.14 | 2.3527 | 27 33 39.9 | 2.540 |
| 6 | 5 8 15.43 | 2.3871 | 26 43 16.5 | 4.730 | 6 | 7 2 56.21 | 2.3495 | 27 31 3.1 | 2.687 |
| 7 | 5 10 38.71 | 2.3888 | 26 47 55.7 | 4.577 | 7 | 7 5 17.08 | 2.3461 | 27 28 17.4 | 2.834 |
| 8 | 5 13 2.09 | 2.3904 | 26 52 25.7 | 4.423 | 8 | 7 7 37.74 | 2.3426 | 27 25 22.9 | 2.980 |
| 9 | 5 15 25.56 | 2.3919 | 26 56 46.5 | 4.268 | 9 | 7 9 58.19 | 2.3389 | 27 22 19.7 | 3.125 |
| 10 | 5 17 49.11 | 2.3932 | 27 0 57.9 | 4.113 | 10 | 7 12 18.42 | 2.3352 | 27 19 7.9 | 3.268 |
| 11 | 5 20 12.74 | 2.3945 | 27 5 0.0 | 3.957 | 11 | 7 14 38.42 | 2.3314 | 27 15 47.5 | 3.411 |
| 12 | 5 22 36.45 | 2.3957 | 27 8 52.8 | 3.802 | 12 | 7 16 58.19 | 2.3276 | 27 12 18.6 | 3.553 |
| 13 | 5 25 0.23 | 2.3969 | 27 12 36.3 | 3.647 | 13 | 7 19 17.73 | 2.3237 | 27 8 41.1 | 3.696 |
| 14 | 5 27 24.08 | 2.3980 | 27 16 10.5 | 3.492 | 14 | 7 21 37.04 | 2.3198 | 27 4 55.1 | 3.836 |
| 15 | 5 29 47.99 | 2.3989 | 27 19 35.4 | 3.336 | 15 | 7 23 56.11 | 2.3157 | 27 1 0.6 | 3.977 |
| 16 | 5 32 11.95 | 2.3997 | 27 22 50.9 | 3.180 | 16 | 7 26 14.93 | 2.3116 | 26 56 57.7 | 4.117 |
| 17 | 5 34 35.96 | 2.4005 | 27 25 57.0 | 3.023 | 17 | 7 28 33.49 | 2.3072 | 26 52 46.4 | 4.257 |
| 18 | 5 37 0.01 | 2.4011 | 27 28 53.7 | 2.866 | 18 | 7 30 51.79 | 2.3028 | 26 48 26.7 | 4.397 |
| 19 | 5 39 24.09 | 2.4016 | 27 31 40.9 | 2.708 | 19 | 7 33 9.83 | 2.2985 | 26 43 58.7 | 4.535 |
| 20 | 5 41 48.20 | 2.4020 | 27 34 18.7 | 2.551 | 20 | 7 35 27.61 | 2.2941 | 26 39 22.5 | 4.671 |
| 21 | 5 44 12.33 | 2.4023 | 27 36 47.1 | 2.395 | 21 | 7 37 45.12 | 2.2896 | 26 34 38.3 | 4.805 |
| 22 | 5 46 36.47 | 2.4024 | 27 39 6.2 | 2.240 | 22 | 7 40 2.36 | 2.2850 | 26 29 46.0 | 4.938 |
| 23 | 5 49 0.62 | 2.4025 | 27 41 15.9 | 2.083 | 23 | 7 42 19.32 | 2.2803 | 26 24 45.7 | 5.071 |
| 24 | 5 51 24.77 | 2.4024 | N.27 43 16.1 | 1.925 | 24 | 7 44 35.99 | 2.2755 | N.26 19 37.4 | 5.204 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | **MONDAY 21.** | | | | | **WEDNESDAY 23.** | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 44 35.99 | 2.2755 | N.26 19 37.4 | 5.204 | 0 | 9 27 39.80 | 2.0140 | N.19 56 49.0 | 10.328 |
| 1 | 7 46 52.37 | 2.2707 | 26 14 21.2 | 5.336 | 1 | 9 29 40.48 | 2.0086 | 19 46 26.9 | 10.408 |
| 2 | 7 49 8.47 | 2.2659 | 26 8 57.1 | 5.467 | 2 | 9 31 40.84 | 2.0032 | 19 36 0.1 | 10.486 |
| 3 | 7 51 24.28 | 2.2610 | 26 3 25.2 | 5.597 | 3 | 9 33 40.87 | 1.9978 | 19 25 28.7 | 10.563 |
| 4 | 7 53 39.79 | 2.2560 | 25 57 45.5 | 5.726 | 4 | 9 35 40.58 | 1.9925 | 19 14 52.6 | 10.640 |
| 5 | 7 55 55.00 | 2.2510 | 25 51 58.1 | 5.853 | 5 | 9 37 39.97 | 1.9873 | 19 4 11.9 | 10.716 |
| 6 | 7 58 9.91 | 2.2459 | 25 46 3.1 | 5.980 | 6 | 9 39 39.05 | 1.9821 | 18 53 26.7 | 10.790 |
| 7 | 8 0 24.51 | 2.2407 | 25 40 0.5 | 6.106 | 7 | 9 41 37.82 | 1.9769 | 18 42 37.1 | 10.863 |
| 8 | 8 2 38.80 | 2.2355 | 25 33 50.4 | 6.231 | 8 | 9 43 36.28 | 1.9717 | 18 31 43.1 | 10.936 |
| 9 | 8 4 52.78 | 2.2303 | 25 27 32.8 | 6.355 | 9 | 9 45 34.43 | 1.9666 | 18 20 44.8 | 11.007 |
| 10 | 8 7 6.45 | 2.2251 | 25 21 7.8 | 6.477 | 10 | 9 47 32.27 | 1.9615 | 18 9 42.2 | 11.078 |
| 11 | 8 9 19.80 | 2.2198 | 25 14 35.6 | 6.597 | 11 | 9 49 29.80 | 1.9564 | 17 58 35.4 | 11.148 |
| 12 | 8 11 32.83 | 2.2145 | 25 7 56.2 | 6.717 | 12 | 9 51 27.03 | 1.9514 | 17 47 24.4 | 11.217 |
| 13 | 8 13 45.54 | 2.2092 | 25 1 9.6 | 6.837 | 13 | 9 53 23.97 | 1.9465 | 17 36 9.3 | 11.285 |
| 14 | 8 15 57.93 | 2.2038 | 24 54 15.8 | 6.956 | 14 | 9 55 20.61 | 1.9416 | 17 24 50.2 | 11.351 |
| 15 | 8 18 10.00 | 2.1984 | 24 47 14.9 | 7.078 | 15 | 9 57 16.96 | 1.9367 | 17 13 27.3 | 11.416 |
| 16 | 8 20 21.74 | 2.1929 | 24 40 7.0 | 7.190 | 16 | 9 59 13.02 | 1.9319 | 17 2 0.5 | 11.479 |
| 17 | 8 22 33.14 | 2.1873 | 24 32 52.1 | 7.306 | 17 | 10 1 8.79 | 1.9271 | 16 50 29.9 | 11.542 |
| 18 | 8 24 44.21 | 2.1817 | 24 25 30.3 | 7.420 | 18 | 10 3 4.27 | 1.9223 | 16 38 55.5 | 11.604 |
| 19 | 8 26 54.95 | 2.1762 | 24 18 1.7 | 7.533 | 19 | 10 4 59.46 | 1.9176 | 16 27 17.4 | 11.666 |
| 20 | 8 29 5.36 | 2.1707 | 24 10 26.4 | 7.644 | 20 | 10 6 54.37 | 1.9128 | 16 15 35.6 | 11.727 |
| 21 | 8 31 15.44 | 2.1652 | 24 2 44.4 | 7.755 | 21 | 10 8 49.01 | 1.9084 | 16 3 50.2 | 11.786 |
| 22 | 8 33 25.19 | 2.1597 | 23 54 55.8 | 7.864 | 22 | 10 10 43.38 | 1.9039 | 15 52 1.3 | 11.844 |
| 23 | 8 35 34.60 | 2.1540 | N.23 47 0.7 | 7.972 | 23 | 10 12 37.48 | 1.8995 | N.15 40 9.0 | 11.900 |
| | **TUESDAY 22.** | | | | | **THURSDAY 24.** | | | |
| 0 | 8 37 43.67 | 2.1483 | N.23 38 59.1 | 8.080 | 0 | 10 14 31.31 | 1.8952 | N.15 28 13.3 | 11.956 |
| 1 | 8 39 52.40 | 2.1427 | 23 30 51.1 | 8.186 | 1 | 10 16 24.88 | 1.8907 | 15 16 14.1 | 12.014 |
| 2 | 8 42 0.79 | 2.1370 | 23 22 36.8 | 8.291 | 2 | 10 18 18.19 | 1.8863 | 15 4 11.6 | 12.069 |
| 3 | 8 44 8.84 | 2.1313 | 23 14 16.2 | 8.395 | 3 | 10 20 11.24 | 1.8820 | 14 52 5.8 | 12.122 |
| 4 | 8 46 16.55 | 2.1257 | 23 5 49.3 | 8.499 | 4 | 10 22 4.04 | 1.8777 | 14 39 56.9 | 12.175 |
| 5 | 8 48 23.92 | 2.1200 | 22 57 16.2 | 8.602 | 5 | 10 23 56.58 | 1.8735 | 14 27 44.9 | 12.227 |
| 6 | 8 50 30.95 | 2.1143 | 22 48 37.0 | 8.703 | 6 | 10 25 48.86 | 1.8694 | 14 15 29.7 | 12.278 |
| 7 | 8 52 37.64 | 2.1087 | 22 39 51.8 | 8.803 | 7 | 10 27 40.90 | 1.8653 | 14 3 11.5 | 12.328 |
| 8 | 8 54 43.99 | 2.1030 | 22 31 0.7 | 8.901 | 8 | 10 29 32.70 | 1.8613 | 13 50 50.4 | 12.377 |
| 9 | 8 56 50.00 | 2.0974 | 22 22 3.8 | 8.997 | 9 | 10 31 24.26 | 1.8574 | 13 38 26.3 | 12.425 |
| 10 | 8 58 55.68 | 2.0917 | 22 13 1.1 | 9.093 | 10 | 10 33 15.58 | 1.8535 | 13 25 59.4 | 12.472 |
| 11 | 9 1 1.01 | 2.0860 | 22 3 52.6 | 9.189 | 11 | 10 35 6.67 | 1.8497 | 13 13 29.7 | 12.518 |
| 12 | 9 3 6.00 | 2.0803 | 21 54 38.4 | 9.283 | 12 | 10 36 57.54 | 1.8459 | 13 0 57.2 | 12.564 |
| 13 | 9 5 10.65 | 2.0747 | 21 45 18.6 | 9.377 | 13 | 10 38 48.18 | 1.8422 | 12 48 22.0 | 12.609 |
| 14 | 9 7 14.97 | 2.0692 | 21 35 53.2 | 9.469 | 14 | 10 40 38.60 | 1.8386 | 12 35 44.1 | 12.653 |
| 15 | 9 9 18.96 | 2.0636 | 21 26 22.3 | 9.560 | 15 | 10 42 28.80 | 1.8350 | 12 23 3.6 | 12.696 |
| 16 | 9 11 22.61 | 2.0580 | 21 16 46.0 | 9.649 | 16 | 10 44 18.79 | 1.8315 | 12 10 20.6 | 12.738 |
| 17 | 9 13 25.92 | 2.0523 | 21 7 4.4 | 9.737 | 17 | 10 46 8.57 | 1.8280 | 11 57 35.1 | 12.779 |
| 18 | 9 15 28.89 | 2.0467 | 20 57 17.6 | 9.824 | 18 | 10 47 58.14 | 1.8245 | 11 44 47.1 | 12.820 |
| 19 | 9 17 31.53 | 2.0412 | 20 47 25.6 | 9.910 | 19 | 10 49 47.51 | 1.8212 | 11 31 56.7 | 12.860 |
| 20 | 9 19 33.84 | 2.0357 | 20 37 28.4 | 9.996 | 20 | 10 51 36.68 | 1.8180 | 11 19 3.9 | 12.898 |
| 21 | 9 21 35.82 | 2.0302 | 20 27 26.1 | 10.081 | 21 | 10 53 25.66 | 1.8148 | 11 6 8.9 | 12.935 |
| 22 | 9 23 37.47 | 2.0248 | 20 17 18.7 | 10.165 | 22 | 10 55 14.45 | 1.8116 | 10 53 11.7 | 12.972 |
| 23 | 9 25 38.80 | 2.0194 | 20 7 6.3 | 10.247 | 23 | 10 57 3.05 | 1.8085 | 10 40 12.3 | 13.009 |
| 24 | 9 27 39.80 | 2.0140 | N.19 56 49.0 | 10.328 | 24 | 10 58 51.46 | 1.8054 | N.10 27 10.6 | 13.045 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 58 51.46 | 1.8054 | N.10 27 10.6 | 13.045 |
| 1 | 11 0 39.69 | 1.8024 | 10 14 6.8 | 13.080 |
| 2 | 11 2 27.75 | 1.7995 | 10 1 1.0 | 13.113 |
| 3 | 11 4 15.63 | 1.7967 | 9 47 53.2 | 13.146 |
| 4 | 11 6 3.34 | 1.7940 | 9 34 43.5 | 13.178 |
| 5 | 11 7 50.89 | 1.7914 | 9 21 31.8 | 13.211 |
| 6 | 11 9 38.29 | 1.7888 | 9 8 18.2 | 13.242 |
| 7 | 11 11 25.53 | 1.7862 | 8 55 2.8 | 13.272 |
| 8 | 11 13 12.62 | 1.7837 | 8 41 45.6 | 13.300 |
| 9 | 11 14 59.56 | 1.7812 | 8 28 26.7 | 13.328 |
| 10 | 11 16 46.35 | 1.7787 | 8 15 6.2 | 13.356 |
| 11 | 11 18 33.00 | 1.7764 | 8 1 44.0 | 13.384 |
| 12 | 11 20 19.51 | 1.7742 | 7 48 20.1 | 13.411 |
| 13 | 11 22 5.89 | 1.7721 | 7 34 54.7 | 13.436 |
| 14 | 11 23 52.15 | 1.7700 | 7 21 27.8 | 13.460 |
| 15 | 11 25 38.28 | 1.7680 | 7 7 59.5 | 13.484 |
| 16 | 11 27 24.29 | 1.7660 | 6 54 29.8 | 13.507 |
| 17 | 11 29 10.19 | 1.7640 | 6 40 58.7 | 13.530 |
| 18 | 11 30 55.98 | 1.7622 | 6 27 26.2 | 13.552 |
| 19 | 11 32 41.66 | 1.7605 | 6 13 52.4 | 13.573 |
| 20 | 11 34 27.24 | 1.7588 | 6 0 17.4 | 13.593 |
| 21 | 11 36 12.72 | 1.7572 | 5 46 41.3 | 13.613 |
| 22 | 11 37 58.10 | 1.7557 | 5 33 4.0 | 13.632 |
| 23 | 11 39 43.39 | 1.7542 | N. 5 19 25.5 | 13.650 |

### SATURDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 41 28.60 | 1.7528 | N. 5 5 45.9 | 13.668 |
| 1 | 11 43 13.73 | 1.7515 | 4 52 5.3 | 13.685 |
| 2 | 11 44 58.78 | 1.7502 | 4 38 23.7 | 13.701 |
| 3 | 11 46 43.75 | 1.7490 | 4 24 41.2 | 13.716 |
| 4 | 11 48 28.66 | 1.7478 | 4 10 57.8 | 13.731 |
| 5 | 11 50 13.50 | 1.7468 | 3 57 13.6 | 13.745 |
| 6 | 11 51 58.28 | 1.7459 | 3 43 28.3 | 13.759 |
| 7 | 11 53 43.01 | 1.7451 | 3 29 42.4 | 13.772 |
| 8 | 11 55 27.69 | 1.7443 | 3 15 55.7 | 13.784 |
| 9 | 11 57 9.32 | 1.7435 | 3 2 8.3 | 13.795 |
| 10 | 11 58 56.90 | 1.7428 | 2 48 20.3 | 13.806 |
| 11 | 12 0 41.44 | 1.7422 | 2 34 31.6 | 13.817 |
| 12 | 12 2 25.95 | 1.7417 | 2 20 42.3 | 13.826 |
| 13 | 12 4 10.43 | 1.7412 | 2 6 52.5 | 13.834 |
| 14 | 12 5 54.89 | 1.7408 | 1 53 2.2 | 13.842 |
| 15 | 12 7 39.32 | 1.7405 | 1 39 11.5 | 13.850 |
| 16 | 12 9 23.74 | 1.7402 | 1 25 20.3 | 13.857 |
| 17 | 12 11 8.15 | 1.7400 | 1 11 28.7 | 13.863 |
| 18 | 12 12 52.55 | 1.7400 | 0 57 36.7 | 13.869 |
| 19 | 12 14 36.95 | 1.7400 | 0 43 44.4 | 13.873 |
| 20 | 12 16 21.35 | 1.7400 | 0 29 51.9 | 13.877 |
| 21 | 12 18 5.75 | 1.7401 | 0 15 59.2 | 13.880 |
| 22 | 12 19 50.17 | 1.7403 | N. 0 2 6.3 | 13.883 |
| 23 | 12 21 34.60 | 1.7406 | S. 0 11 46.7 | 13.885 |
| 24 | 12 23 19.05 | 1.7410 | S. 0 25 39.9 | 13.887 |

### SUNDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 23 19.05 | 1.7410 | S. 0 25 39.9 | 13.887 |
| 1 | 12 25 3.52 | 1.7415 | 0 39 33.2 | 13.888 |
| 2 | 12 26 48.02 | 1.7420 | 0 53 26.5 | 13.887 |
| 3 | 12 28 32.56 | 1.7425 | 1 7 19.7 | 13.887 |
| 4 | 12 30 17.13 | 1.7432 | 1 21 12.9 | 13.886 |
| 5 | 12 32 1.74 | 1.7439 | 1 35 6.0 | 13.883 |
| 6 | 12 33 46.40 | 1.7448 | 1 48 58.9 | 13.880 |
| 7 | 12 35 31.11 | 1.7457 | 2 2 51.6 | 13.877 |
| 8 | 12 37 15.88 | 1.7467 | 2 16 44.3 | 13.874 |
| 9 | 12 39 0.71 | 1.7477 | 2 30 36.6 | 13.870 |
| 10 | 12 40 45.60 | 1.7488 | 2 44 28.7 | 13.865 |
| 11 | 12 42 30.56 | 1.7500 | 2 58 20.4 | 13.859 |
| 12 | 12 44 15.59 | 1.7512 | 3 12 11.8 | 13.853 |
| 13 | 12 46 0.70 | 1.7525 | 3 26 2.7 | 13.845 |
| 14 | 12 47 45.90 | 1.7540 | 3 39 53.2 | 13.837 |
| 15 | 12 49 31.18 | 1.7555 | 3 53 43.2 | 13.829 |
| 16 | 12 51 16.56 | 1.7571 | 4 7 32.7 | 13.820 |
| 17 | 12 53 2.04 | 1.7588 | 4 21 21.6 | 13.811 |
| 18 | 12 54 47.62 | 1.7605 | 4 35 10.0 | 13.800 |
| 19 | 12 56 33.30 | 1.7623 | 4 48 57.7 | 13.788 |
| 20 | 12 58 19.09 | 1.7642 | 5 2 44.6 | 13.776 |
| 21 | 13 0 5.00 | 1.7662 | 5 16 30.8 | 13.764 |
| 22 | 13 1 51.03 | 1.7682 | 5 30 16.3 | 13.751 |
| 23 | 13 3 37.19 | 1.7703 | S. 5 44 0.9 | 13.736 |

### MONDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 13 5 23.47 | 1.7725 | S. 5 57 44.6 | 13.721 |
| 1 | 13 7 9.89 | 1.7748 | 6 11 27.4 | 13.706 |
| 2 | 13 8 36.45 | 1.7772 | 6 25 9.3 | 13.690 |
| 3 | 13 10 43.15 | 1.7797 | 6 38 50.2 | 13.673 |
| 4 | 13 12 30.00 | 1.7822 | 6 52 30.1 | 13.656 |
| 5 | 13 14 17.01 | 1.7848 | 7 6 8.9 | 13.637 |
| 6 | 13 16 4.17 | 1.7874 | 7 19 46.5 | 13.617 |
| 7 | 13 17 51.50 | 1.7902 | 7 33 23.0 | 13.597 |
| 8 | 13 19 39.00 | 1.7931 | 7 46 58.3 | 13.577 |
| 9 | 13 21 26.67 | 1.7960 | 8 0 32.3 | 13.556 |
| 10 | 13 23 14.52 | 1.7990 | 8 14 5.0 | 13.534 |
| 11 | 13 25 2.55 | 1.8021 | 8 27 36.4 | 13.512 |
| 12 | 13 26 50.77 | 1.8053 | 8 41 6.4 | 13.488 |
| 13 | 13 28 39.18 | 1.8085 | 8 54 34.9 | 13.463 |
| 14 | 13 30 27.79 | 1.8118 | 9 8 1.9 | 13.438 |
| 15 | 13 32 16.60 | 1.8152 | 9 21 27.5 | 13.413 |
| 16 | 13 34 5.61 | 1.8187 | 9 34 51.5 | 13.386 |
| 17 | 13 35 54.84 | 1.8222 | 9 48 13.9 | 13.358 |
| 18 | 13 37 44.28 | 1.8258 | 10 1 34.5 | 13.330 |
| 19 | 13 39 33.94 | 1.8296 | 10 14 53.4 | 13.301 |
| 20 | 13 41 23.83 | 1.8334 | 10 28 10.6 | 13.272 |
| 21 | 13 43 13.95 | 1.8373 | 10 41 26.0 | 13.241 |
| 22 | 13 45 4.31 | 1.8413 | 10 54 39.5 | 13.209 |
| 23 | 13 46 54.91 | 1.8453 | 11 7 51.1 | 13.176 |
| 24 | 13 48 45.74 | 1.8493 | S.11 21 0.7 | 13.142 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 48 45.74 | 1.8493 | S.11 21 0.7 | 13.142 |
| 1 | 13 50 36.82 | 1.8535 | 11 34 8.2 | 13.108 |
| 2 | 13 52 28.16 | 1.8578 | 11 47 13.7 | 13.074 |
| 3 | 13 54 19.76 | 1.8622 | 12 0 17.1 | 13.038 |
| 4 | 13 56 11.63 | 1.8667 | 12 13 18.3 | 13.002 |
| 5 | 13 58 3.77 | 1.8712 | 12 26 17.3 | 12.964 |
| 6 | 13 59 56.18 | 1.8757 | 12 39 14.0 | 12.925 |
| 7 | 14 1 48.86 | 1.8804 | 12 52 8.3 | 12.886 |
| 8 | 14 3 41.83 | 1.8852 | 13 5 0.2 | 12.845 |
| 9 | 14 5 35.09 | 1.8901 | 13 17 49.7 | 12.804 |
| 10 | 14 7 28.64 | 1.8951 | 13 30 36.7 | 12.762 |
| 11 | 14 9 22.49 | 1.9001 | 13 43 21.2 | 12.719 |
| 12 | 14 11 16.64 | 1.9051 | 13 56 3.0 | 12.674 |
| 13 | 14 13 11.10 | 1.9102 | 14 8 42.1 | 12.629 |
| 14 | 14 15 5.87 | 1.9154 | 14 21 18.5 | 12.583 |
| 15 | 14 17 0.95 | 1.9207 | 14 33 52.1 | 12.536 |
| 16 | 14 18 56.35 | 1.9261 | 14 46 22.8 | 12.488 |
| 17 | 14 20 52.08 | 1.9317 | 14 58 50.6 | 12.440 |
| 18 | 14 22 48.15 | 1.9373 | 15 11 15.5 | 12.391 |
| 19 | 14 24 44.56 | 1.9429 | 15 23 37.5 | 12.340 |
| 20 | 14 26 41.30 | 1.9485 | 15 35 56.3 | 12.287 |
| 21 | 14 28 38.37 | 1.9542 | 15 48 11.9 | 12.233 |
| 22 | 14 30 35.79 | 1.9600 | 16 0 24.2 | 12.177 |
| 23 | 14 32 33.57 | 1.9659 | S.16 12 33.1 | 12.121 |

### WEDNESDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 34 31.70 | 1.9718 | S.16 24 38.6 | 12.064 |
| 1 | 14 36 30.19 | 1.9779 | 16 36 40.7 | 12.007 |
| 2 | 14 38 29.05 | 1.9841 | 16 48 39.4 | 11.949 |
| 3 | 14 40 28.28 | 1.9903 | 17 0 34.6 | 11.889 |
| 4 | 14 42 27.89 | 1.9966 | 17 12 26.1 | 11.828 |
| 5 | 14 44 27.88 | 2.0030 | 17 24 14.0 | 11.767 |
| 6 | 14 46 28.25 | 2.0093 | 17 35 58.1 | 11.703 |
| 7 | 14 48 29.00 | 2.0157 | 17 47 38.3 | 11.638 |
| 8 | 14 50 30.14 | 2.0223 | 17 59 14.6 | 11.572 |
| 9 | 14 52 31.68 | 2.0290 | 18 10 47.0 | 11.506 |
| 10 | 14 54 33.62 | 2.0357 | 18 22 15.3 | 11.438 |
| 11 | 14 56 35.96 | 2.0424 | 18 33 39.5 | 11.368 |
| 12 | 14 58 38.71 | 2.0492 | 18 44 59.5 | 11.297 |
| 13 | 15 0 41.87 | 2.0562 | 18 56 15.2 | 11.226 |
| 14 | 15 2 45.45 | 2.0632 | 19 7 26.5 | 11.152 |
| 15 | 15 4 49.45 | 2.0702 | 19 18 33.5 | 11.078 |
| 16 | 15 6 53.87 | 2.0772 | 19 29 36.0 | 11.003 |
| 17 | 15 8 58.71 | 2.0842 | 19 40 33.9 | 10.926 |
| 18 | 15 11 3.98 | 2.0914 | 19 51 27.1 | 10.847 |
| 19 | 15 13 9.68 | 2.0986 | 20 2 15.6 | 10.767 |
| 20 | 15 15 15.82 | 2.1059 | 20 12 59.2 | 10.687 |
| 21 | 15 17 22.39 | 2.1132 | 20 23 38.0 | 10.606 |
| 22 | 15 19 29.41 | 2.1206 | 20 34 11.8 | 10.522 |
| 23 | 15 21 36.87 | 2.1281 | 20 44 40.6 | 10.437 |
| 24 | 15 23 44.78 | 2.1356 | S.20 55 4.2 | 10.350 |

### THURSDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 23 44.78 | 2.1356 | S.20 55 4.2 | 10.350 |
| 1 | 15 25 53.14 | 2.1431 | 21 5 22.6 | 10.262 |
| 2 | 15 28 1.96 | 2.1507 | 21 15 35.6 | 10.172 |
| 3 | 15 30 11.23 | 2.1583 | 21 25 43.3 | 10.082 |
| 4 | 15 32 20.96 | 2.1660 | 21 35 45.5 | 9.991 |
| 5 | 15 34 31.16 | 2.1738 | 21 45 42.2 | 9.898 |
| 6 | 15 36 41.82 | 2.1816 | 21 55 33.2 | 9.803 |
| 7 | 15 38 52.95 | 2.1894 | 22 5 18.5 | 9.706 |
| 8 | 15 41 4.55 | 2.1972 | 22 14 57.9 | 9.607 |
| 9 | 15 43 16.61 | 2.2050 | 22 24 31.4 | 9.508 |
| 10 | 15 45 29.15 | 2.2129 | 22 33 58.9 | 9.407 |
| 11 | 15 47 42.16 | 2.2208 | 22 43 20.3 | 9.305 |
| 12 | 15 49 55.65 | 2.2288 | 22 52 35.5 | 9.202 |
| 13 | 15 52 9.62 | 2.2368 | 23 1 44.5 | 9.097 |
| 14 | 15 54 24.07 | 2.2448 | 23 10 47.1 | 8.990 |
| 15 | 15 56 38.99 | 2.2528 | 23 19 43.3 | 8.882 |
| 16 | 15 58 54.40 | 2.2608 | 23 28 32.9 | 8.772 |
| 17 | 16 1 10.29 | 2.2688 | 23 37 15.9 | 8.660 |
| 18 | 16 3 26.66 | 2.2769 | 23 45 52.1 | 8.547 |
| 19 | 16 5 43.52 | 2.2850 | 23 54 21.5 | 8.433 |
| 20 | 16 8 0.86 | 2.2931 | 24 2 44.0 | 8.316 |
| 21 | 16 10 18.69 | 2.3012 | 24 10 59.4 | 8.198 |
| 22 | 16 12 37.00 | 2.3092 | 24 19 7.8 | 8.080 |
| 23 | 16 14 55.79 | 2.3172 | S.24 27 9.0 | 7.958 |

### FRIDAY, FEBRUARY 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 16 17 15.07 | 2.3253 | S.24 35 2.8 | 7.835 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ● New Moon, . . | 7 | 11 | 17.3 |
| ☽ First Quarter, . | 14 | 3 | 42.7 |
| ○ Full Moon, . . | 21 | 15 | 28.8 |
| ☾ Last Quarter, . . | 29 | 20 | 34.8 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . | 9 | 22.0 |
| ☾ Apogee, . . . . | 25 | 21.0 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Regulus | W. | 53 26 4 | 2975 | 54 56 48 | 2964 | 56 27 46 | 2953 | 57 58 58 | 2940 |
| | Venus | E. | 33 26 27 | 3451 | 32 5 8 | 3438 | 30 43 34 | 3428 | 29 21 49 | 3420 |
| | Antares | E. | 46 45 2 | 2962 | 45 14 2 | 2951 | 43 42 48 | 2939 | 42 11 19 | 2928 |
| | Sun | E. | 79 3 41 | 3357 | 77 40 35 | 3345 | 76 17 15 | 3332 | 74 53 41 | 3320 |
| 2 | Regulus | W. | 65 39 3 | 2874 | 67 11 55 | 2860 | 68 45 5 | 2846 | 70 18 34 | 2831 |
| | Mars | W. | 24 49 45 | 3008 | 26 19 48 | 2994 | 27 50 8 | 2976 | 29 20 47 | 2964 |
| | Antares | E. | 34 30 11 | 2866 | 32 57 8 | 2853 | 31 23 49 | 2839 | 29 50 12 | 2825 |
| | Sun | E. | 67 52 8 | 3253 | 66 27 1 | 3238 | 65 1 37 | 3223 | 63 35 55 | 3207 |
| 3 | Regulus | W. | 78 10 53 | 2753 | 79 46 23 | 2737 | 81 22 14 | 2721 | 82 58 26 | 2704 |
| | Mars | W. | 36 58 59 | 2883 | 38 31 39 | 2866 | 40 4 41 | 2850 | 41 38 4 | 2833 |
| | Sun | E. | 56 22 44 | 3128 | 54 55 8 | 3110 | 53 27 11 | 3094 | 51 58 54 | 3077 |
| 4 | Regulus | W. | 91 5 4 | 2621 | 92 43 31 | 2603 | 94 22 22 | 2586 | 96 1 36 | 2569 |
| | Mars | W. | 49 30 39 | 2745 | 51 6 19 | 2727 | 52 42 23 | 2709 | 54 18 51 | 2692 |
| | Sun | E. | 44 32 20 | 2994 | 43 2 0 | 2977 | 41 31 19 | 2962 | 40 0 18 | 2945 |
| 9 | Sun | W. | 21 23 12 | 2556 | 23 3 7 | 2539 | 24 43 26 | 2525 | 26 24 4 | 2515 |
| | a Arietis | E. | 87 15 25 | 2190 | 85 26 42 | 2188 | 83 37 56 | 2187 | 81 49 9 | 2186 |
| | Aldebaran | E. | 117 40 20 | 2191 | 115 51 39 | 2186 | 114 2 51 | 2183 | 112 13 58 | 2181 |
| 10 | Sun | W. | 34 50 4 | 2480 | 36 31 34 | 2487 | 38 13 6 | 2487 | 39 54 38 | 2487 |
| | a Arietis | E. | 72 45 15 | 2193 | 70 56 37 | 2197 | 69 8 5 | 2201 | 67 19 39 | 2206 |
| | Aldebaran | E. | 103 8 59 | 2178 | 101 19 59 | 2180 | 99 31 1 | 2182 | 97 42 6 | 2185 |
| | Saturn | E. | 120 29 16 | 2131 | 118 39 4 | 2134 | 116 48 56 | 2135 | 114 58 50 | 2137 |
| 11 | Sun | W. | 48 21 43 | 2502 | 50 2 54 | 2507 | 51 43 58 | 2512 | 53 24 54 | 2518 |
| | a Arietis | E. | 58 19 42 | 2242 | 56 32 17 | 2251 | 54 45 5 | 2261 | 52 58 8 | 2272 |
| | Aldebaran | E. | 88 38 53 | 2207 | 86 50 36 | 2212 | 85 2 27 | 2219 | 83 14 28 | 2226 |
| | Saturn | E. | 105 49 31 | 2157 | 103 59 59 | 2163 | 102 10 35 | 2169 | 100 21 20 | 2175 |
| 12 | Sun | W. | 61 47 21 | 2554 | 63 27 19 | 2563 | 65 7 5 | 2572 | 66 46 39 | 2580 |
| | Jupiter | W. | 20 17 47 | 2329 | 22 3 4 | 2331 | 23 48 18 | 2335 | 25 33 27 | 2339 |
| | a Arietis | E. | 44 7 52 | 2341 | 42 22 52 | 2359 | 40 38 18 | 2378 | 38 54 11 | 2396 |
| | Aldebaran | E. | 74 17 18 | 2267 | 72 30 30 | 2276 | 70 43 55 | 2286 | 68 57 35 | 2296 |
| | Saturn | E. | 91 17 38 | 2211 | 89 29 27 | 2220 | 87 41 30 | 2229 | 85 53 45 | 2238 |
| 13 | Sun | W. | 75 1 21 | 2629 | 76 39 37 | 2639 | 78 17 39 | 2649 | 79 55 27 | 2660 |
| | Fomalhaut | W. | 39 46 8 | 2766 | 41 21 20 | 2744 | 42 57 2 | 2725 | 44 33 9 | 2708 |
| | Jupiter | W. | 34 17 16 | 2372 | 36 1 31 | 2380 | 37 45 34 | 2389 | 39 29 25 | 2398 |
| | Aldebaran | E. | 60 9 49 | 2353 | 58 25 6 | 2364 | 56 40 40 | 2377 | 54 56 32 | 2391 |
| | Saturn | E. | 76 58 24 | 2285 | 75 12 2 | 2296 | 73 25 56 | 2305 | 71 40 4 | 2316 |
| | Pollux | E. | 103 47 2 | 2288 | 102 0 45 | 2298 | 100 14 42 | 2308 | 98 28 54 | 2317 |
| 14 | Sun | W. | 88 0 48 | 2714 | 89 37 9 | 2725 | 91 13 15 | 2736 | 92 49 7 | 2747 |
| | Fomalhaut | W. | 52 37 45 | 2669 | 54 15 7 | 2666 | 55 52 32 | 2665 | 57 29 59 | 2665 |
| | Jupiter | W. | 48 5 22 | 2445 | 49 47 53 | 2455 | 51 30 9 | 2465 | 53 12 11 | 2475 |
| | a Pegasi | W. | 35 44 37 | 3530 | 37 4 28 | 3451 | 38 25 47 | 3381 | 39 48 25 | 3321 |
| | Aldebaran | E. | 46 20 50 | 2463 | 44 38 45 | 2480 | 42 57 3 | 2497 | 41 15 45 | 2515 |
| | Saturn | E. | 62 54 36 | 2369 | 61 10 17 | 2380 | 59 26 14 | 2391 | 57 42 27 | 2403 |
| | Pollux | E. | 89 43 32 | 2368 | 87 59 12 | 2378 | 86 15 6 | 2389 | 84 31 15 | 2399 |
| 15 | Sun | W. | 100 44 43 | 2804 | 102 19 6 | 2815 | 103 53 15 | 2826 | 105 27 9 | 2837 |
| | Fomalhaut | W. | 65 36 56 | 2677 | 67 14 7 | 2681 | 68 51 12 | 2686 | 70 28 11 | 2692 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Regulus | W. | 59 30 36 | 2927 | 61 2 11 | 2914 | 62 34 12 | 2901 | 64 6 29 | 2888 |
| | Venus | E. | 27 59 55 | 3414 | 26 37 54 | 3409 | 25 15 48 | 3406 | 23 53 37 | 3404 |
| | Antares | E. | 40 39 36 | 2917 | 39 7 39 | 2905 | 37 35 26 | 2892 | 36 2 57 | 2878 |
| | Sun | E. | 73 29 53 | 3307 | 72 5 50 | 3294 | 70 41 32 | 3281 | 69 16 58 | 3267 |
| 2 | Regulus | W. | 71 52 22 | 2816 | 73 26 29 | 2800 | 75 0 57 | 2785 | 76 35 44 | 2769 |
| | Mars | W. | 30 51 45 | 2948 | 32 23 3 | 2932 | 33 54 41 | 2916 | 35 26 40 | 2900 |
| | Antares | E. | 28 16 16 | 2811 | 26 42 2 | 2796 | 25 7 29 | 2782 | 23 32 38 | 2768 |
| | Sun | E. | 62 9 54 | 3192 | 60 43 35 | 3176 | 59 16 57 | 3160 | 57 50 0 | 3144 |
| 3 | Regulus | W. | 84 35 1 | 2687 | 86 11 58 | 2671 | 87 49 17 | 2654 | 89 26 59 | 2637 |
| | Mars | W. | 43 11 50 | 2815 | 44 45 58 | 2798 | 46 20 29 | 2791 | 47 55 22 | 2763 |
| | Sun | E. | 50 30 16 | 3060 | 49 1 18 | 3043 | 47 31 59 | 3027 | 46 2 20 | 3010 |
| 4 | Regulus | W. | 97 41 14 | 2652 | 99 21 14 | 2635 | 101 1 38 | 2619 | 102 42 25 | 2602 |
| | Mars | W. | 55 55 42 | 2674 | 57 32 57 | 2657 | 59 10 35 | 2639 | 60 48 37 | 2621 |
| | Sun | E. | 38 28 56 | 2930 | 36 57 15 | 2914 | 35 25 14 | 2899 | 33 52 54 | 2885 |
| 9 | Sun | W. | 28 4 57 | 2507 | 29 46 1 | 2499 | 31 27 15 | 2494 | 33 8 37 | 2490 |
| | *a* Arietis | E. | 80 0 20 | 2186 | 78 11 31 | 2186 | 76 22 43 | 2188 | 74 33 57 | 2190 |
| | Aldebaran | E. | 110 25 2 | 2179 | 108 36 3 | 2178 | 106 47 2 | 2177 | 104 58 0 | 2178 |
| 10 | Sun | W. | 41 36 9 | 2489 | 43 17 38 | 2491 | 44 59 4 | 2494 | 46 40 26 | 2497 |
| | *a* Arietis | E. | 65 31 21 | 2212 | 63 43 10 | 2218 | 61 55 10 | 2225 | 60 7 20 | 2233 |
| | Aldebaran | E. | 95 53 16 | 2188 | 94 4 30 | 2192 | 92 15 51 | 2196 | 90 27 18 | 2202 |
| | Saturn | E. | 113 8 47 | 2140 | 111 18 49 | 2144 | 109 28 57 | 2147 | 107 39 10 | 2153 |
| 11 | Sun | W. | 55 5 42 | 2524 | 56 46 22 | 2531 | 58 26 52 | 2538 | 60 7 12 | 2546 |
| | *a* Arietis | E. | 51 11 27 | 2284 | 49 25 4 | 2296 | 47 38 59 | 2311 | 45 53 15 | 2325 |
| | Aldebaran | E. | 81 26 39 | 2233 | 79 39 1 | 2241 | 77 51 35 | 2249 | 76 4 21 | 2256 |
| | Saturn | E. | 98 32 15 | 2182 | 96 43 20 | 2188 | 94 54 35 | 2195 | 93 6 0 | 2204 |
| 12 | Sun | W. | 68 26 1 | 2589 | 70 5 11 | 2599 | 71 44 8 | 2609 | 73 22 51 | 2618 |
| | Jupiter | W. | 27 18 30 | 2344 | 29 3 26 | 2350 | 30 48 13 | 2357 | 32 32 50 | 2364 |
| | *a* Arietis | E. | 37 10 33 | 2421 | 35 27 28 | 2445 | 33 44 58 | 2473 | 32 3 7 | 2504 |
| | Aldebaran | E. | 67 11 30 | 2307 | 65 25 41 | 2317 | 63 40 7 | 2329 | 61 54 50 | 2340 |
| | Saturn | E. | 84 6 14 | 2247 | 82 18 56 | 2256 | 80 31 52 | 2265 | 78 45 1 | 2274 |
| 13 | Sun | W. | 81 33 0 | 2671 | 83 10 19 | 2682 | 84 47 23 | 2692 | 86 24 13 | 2704 |
| | Fomalhaut | W. | 46 9 38 | 2696 | 47 46 43 | 2687 | 49 23 20 | 2679 | 51 0 29 | 2672 |
| | Jupiter | W. | 41 13 3 | 2407 | 42 56 28 | 2416 | 44 39 40 | 2426 | 46 22 38 | 2436 |
| | Aldebaran | E. | 53 12 44 | 2404 | 51 29 15 | 2418 | 49 46 6 | 2433 | 48 3 18 | 2448 |
| | Saturn | E. | 69 54 28 | 2326 | 68 9 7 | 2337 | 66 24 1 | 2348 | 64 39 11 | 2358 |
| | Pollux | E. | 96 43 20 | 2328 | 94 58 1 | 2338 | 93 12 57 | 2348 | 91 28 7 | 2358 |
| 14 | Sun | W. | 94 24 44 | 2759 | 96 0 6 | 2770 | 97 35 13 | 2782 | 99 10 5 | 2792 |
| | Fomalhaut | W. | 59 7 26 | 2665 | 60 44 53 | 2666 | 62 22 18 | 2669 | 63 59 39 | 2672 |
| | Jupiter | W. | 54 53 59 | 2485 | 56 35 33 | 2495 | 58 16 53 | 2505 | 59 57 59 | 2515 |
| | *a* Pegasi | W. | 41 12 12 | 3270 | 42 36 59 | 3225 | 44 2 39 | 3187 | 45 29 4 | 3153 |
| | Aldebaran | E. | 39 34 52 | 2535 | 37 54 27 | 2555 | 36 14 30 | 2577 | 34 35 3 | 2601 |
| | Saturn | E. | 55 58 56 | 2414 | 54 15 41 | 2426 | 52 32 43 | 2437 | 50 50 1 | 2449 |
| | Pollux | E. | 82 47 39 | 2410 | 81 4 18 | 2420 | 79 21 12 | 2430 | 77 38 20 | 2440 |
| 15 | Sun | W. | 107 0 49 | 2849 | 108 34 15 | 2859 | 110 7 26 | 2870 | 111 40 23 | 2880 |
| | Fomalhaut | W. | 72 5 2 | 2698 | 73 41 45 | 2704 | 75 18 20 | 2710 | 76 54 46 | 2718 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 15 | Jupiter W. | 61 38 51 | 2525 | 63 19 29 | 2535 | 64 59 53 | 2545 | 66 40 3 | 2556 |
| | α Pegasi W. | 46 56 10 | 3124 | 48 23 51 | 3100 | 49 52 1 | 3078 | 51 20 37 | 3060 |
| | Aldebaran E. | 32 56 9 | 2627 | 31 17 51 | 2655 | 29 40 10 | 2686 | 28 3 11 | 2721 |
| | Saturn E. | 49 7 36 | 2460 | 47 25 27 | 2473 | 45 43 36 | 2485 | 44 2 1 | 2497 |
| | Pollux E. | 75 55 42 | 2450 | 74 13 18 | 2460 | 72 31 9 | 2470 | 70 49 14 | 2480 |
| 16 | Sun W. | 113 13 7 | 2891 | 114 45 37 | 2903 | 116 17 52 | 2914 | 117 49 53 | 2924 |
| | Fomalhaut W. | 78 31 2 | 2725 | 80 7 9 | 2732 | 81 43 6 | 2741 | 83 18 52 | 2749 |
| | Jupiter W. | 74 57 28 | 2604 | 76 36 17 | 2615 | 78 14 52 | 2624 | 79 53 14 | 2634 |
| | α Pegasi W. | 58 48 18 | 3003 | 60 18 27 | 2997 | 61 48 44 | 2992 | 63 19 7 | 2989 |
| | Saturn E. | 35 38 32 | 2563 | 33 58 46 | 2578 | 32 19 21 | 2593 | 30 40 17 | 2610 |
| | Pollux E. | 62 23 12 | 2530 | 60 42 41 | 2540 | 59 2 23 | 2549 | 57 22 18 | 2559 |
| | Regulus E. | 98 58 8 | 2538 | 97 17 48 | 2548 | 95 37 41 | 2557 | 93 57 47 | 2566 |
| 17 | Fomalhaut W. | 91 14 55 | 2798 | 92 49 32 | 2802 | 94 23 57 | 2812 | 95 58 9 | 2823 |
| | Jupiter W. | 88 1 52 | 2681 | 89 38 58 | 2689 | 91 15 52 | 2699 | 92 52 33 | 2708 |
| | α Pegasi W. | 70 51 40 | 2986 | 72 22 10 | 2989 | 73 52 37 | 2991 | 75 23 1 | 2994 |
| | α Arietis W. | 27 16 30 | 2881 | 28 49 13 | 2862 | 30 22 20 | 2848 | 31 55 45 | 2838 |
| | Pollux E. | 49 5 10 | 2606 | 47 26 23 | 2615 | 45 47 49 | 2624 | 44 9 27 | 2633 |
| | Regulus E. | 85 41 30 | 2612 | 84 2 52 | 2622 | 82 24 27 | 2632 | 80 46 15 | 2640 |
| 18 | Jupiter W. | 100 53 0 | 2753 | 102 28 30 | 2762 | 104 3 48 | 2770 | 105 38 55 | 2779 |
| | α Pegasi W. | 82 53 44 | 3020 | 84 23 32 | 3026 | 85 53 13 | 3033 | 87 22 45 | 3040 |
| | α Arietis W. | 39 45 25 | 2815 | 41 19 34 | 2814 | 42 53 44 | 2815 | 44 27 53 | 2816 |
| | Pollux E. | 36 0 41 | 2678 | 34 23 32 | 2688 | 32 46 36 | 2697 | 31 9 52 | 2706 |
| | Regulus E. | 72 38 11 | 2684 | 71 1 10 | 2693 | 69 24 21 | 2701 | 67 47 43 | 2710 |
| 19 | α Arietis W. | 52 17 55 | 2832 | 53 51 41 | 2836 | 55 25 22 | 2842 | 56 58 56 | 2846 |
| | Aldebaran W. | 22 30 43 | 3073 | 23 59 26 | 3043 | 25 28 45 | 3018 | 26 58 36 | 2999 |
| | Regulus E. | 59 47 28 | 2753 | 58 11 59 | 2763 | 56 36 42 | 2771 | 55 1 36 | 2780 |
| | Mars E. | 106 47 4 | 2852 | 105 13 44 | 2861 | 103 40 35 | 2869 | 102 7 36 | 2877 |
| 20 | α Arietis W. | 64 45 4 | 2875 | 66 17 55 | 2881 | 67 50 38 | 2888 | 69 23 12 | 2894 |
| | Aldebaran W. | 34 32 8 | 2954 | 36 3 18 | 2951 | 37 34 32 | 2950 | 39 5 48 | 2960 |
| | Regulus E. | 47 9 1 | 2825 | 45 35 5 | 2832 | 44 1 19 | 2842 | 42 27 45 | 2852 |
| | Mars E. | 94 25 18 | 2916 | 92 53 20 | 2925 | 91 21 33 | 2932 | 89 49 55 | 2941 |
| | Spica E. | 101 8 42 | 2809 | 99 34 26 | 2818 | 98 0 21 | 2825 | 96 26 26 | 2833 |
| 21 | α Arietis W. | 77 4 0 | 2928 | 78 35 43 | 2935 | 80 7 17 | 2942 | 81 38 42 | 2949 |
| | Aldebaran W. | 46 41 55 | 2958 | 48 13 0 | 2962 | 49 44 1 | 2965 | 51 14 57 | 2970 |
| | Saturn W. | 29 52 58 | 2917 | 31 24 55 | 2920 | 32 56 49 | 2923 | 34 28 39 | 2926 |
| | Mars E. | 82 14 17 | 2980 | 80 43 39 | 2987 | 79 13 10 | 2994 | 77 42 50 | 3002 |
| | Spica E. | 88 39 22 | 2872 | 87 6 27 | 2880 | 85 33 42 | 2887 | 84 1 7 | 2895 |
| 22 | α Arietis W. | 89 13 35 | 2985 | 90 44 7 | 2993 | 92 14 29 | 3000 | 93 44 43 | 3007 |
| | Aldebaran W. | 58 48 12 | 2993 | 60 18 33 | 2999 | 61 48 47 | 3005 | 63 18 54 | 3009 |
| | Saturn W. | 42 6 40 | 2947 | 43 37 59 | 2952 | 45 9 12 | 2957 | 46 40 19 | 2963 |
| | Mars E. | 70 13 30 | 3039 | 68 44 6 | 3047 | 67 14 51 | 3053 | 65 45 44 | 3060 |
| | Spica E. | 76 20 36 | 2932 | 74 48 58 | 2939 | 73 17 29 | 2947 | 71 46 10 | 2954 |
| 23 | Aldebaran W. | 70 47 49 | 3038 | 72 17 15 | 3043 | 73 46 35 | 3048 | 75 15 48 | 3053 |
| | Saturn W. | 54 14 6 | 2990 | 55 44 31 | 2996 | 57 14 49 | 3001 | 58 45 1 | 3006 |
| | Pollux W. | 26 38 23 | 2992 | 28 8 46 | 2997 | 29 39 3 | 3002 | 31 9 13 | 3008 |
| | Mars W. | 58 22 17 | 3093 | 56 53 59 | 3100 | 55 25 49 | 3106 | 53 57 47 | 3112 |
| | Spica E. | 64 11 44 | 2988 | 62 41 16 | 2994 | 61 10 56 | 3001 | 59 40 45 | 3007 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 15 | Jupiter | W. | 68 19 59 | 2565 | 69 59 42 | 2575 | 71 39 11 | 2585 | 73 18 26 | 2595 |
| | α Pegasi | W. | 52 49 36 | 3044 | 54 18 54 | 3030 | 55 48 29 | 3019 | 57 18 18 | 3010 |
| | Aldebaran | E. | 26 26 59 | 2763 | 24 51 42 | 2810 | 23 17 27 | 2866 | 21 44 23 | 2929 |
| | Saturn | E. | 42 20 43 | 2510 | 40 39 43 | 2523 | 38 59 1 | 2535 | 37 18 37 | 2549 |
| | Pollux | E. | 69 7 33 | 2491 | 67 26 7 | 2501 | 65 44 55 | 2511 | 64 3 57 | 2520 |
| 16 | Sun | W. | 119 21 41 | 2935 | 120 53 15 | 2946 | 122 24 35 | 2957 | 123 55 42 | 2968 |
| | Fomalhaut | W. | 84 54 27 | 2757 | 86 29 51 | 2766 | 88 5 4 | 2775 | 89 40 5 | 2784 |
| | Jupiter | W. | 81 31 23 | 2643 | 83 9 19 | 2652 | 84 47 3 | 2662 | 86 24 34 | 2672 |
| | α Pegasi | W. | 64 49 34 | 2986 | 66 20 4 | 2985 | 67 50 36 | 2984 | 69 21 9 | 2985 |
| | Saturn | E. | 29 1 36 | 2627 | 27 23 18 | 2647 | 25 45 27 | 2668 | 24 8 4 | 2692 |
| | Pollux | E. | 55 42 26 | 2568 | 54 2 47 | 2578 | 52 23 22 | 2588 | 50 44 10 | 2596 |
| | Regulus | E. | 92 18 6 | 2676 | 90 38 38 | 2685 | 88 59 23 | 2694 | 87 20 20 | 2604 |
| 17 | Fomalhaut | W. | 97 32 7 | 2833 | 99 5 52 | 2844 | 100 39 23 | 2854 | 102 12 41 | 2866 |
| | Jupiter | W. | 94 29 2 | 2716 | 96 5 20 | 2726 | 97 41 25 | 2735 | 99 17 18 | 2744 |
| | α Pegasi | W. | 76 53 21 | 2998 | 78 23 36 | 3003 | 79 53 45 | 3008 | 81 23 48 | 3014 |
| | α Arietis | W. | 33 29 24 | 2829 | 35 3 14 | 2822 | 36 37 13 | 2818 | 38 11 17 | 2815 |
| | Pollux | E. | 42 31 17 | 2643 | 40 53 20 | 2652 | 39 15 35 | 2660 | 37 38 2 | 2669 |
| | Regulus | E. | 79 8 15 | 2649 | 77 30 26 | 2657 | 75 52 49 | 2666 | 74 15 24 | 2675 |
| 18 | Jupiter | W. | 107 13 50 | 2788 | 108 48 34 | 2795 | 110 23 7 | 2805 | 111 57 29 | 2814 |
| | α Pegasi | W. | 88 52 8 | 3048 | 90 21 21 | 3057 | 91 50 23 | 3066 | 93 19 14 | 3075 |
| | α Arietis | W. | 46 2 0 | 2818 | 47 36 5 | 2821 | 49 10 6 | 2824 | 50 44 4 | 2828 |
| | Pollux | E. | 29 33 20 | 2715 | 27 57 90 | 2724 | 26 20 52 | 2734 | 24 44 57 | 2744 |
| | Regulus | E. | 66 11 17 | 2719 | 64 35 2 | 2728 | 62 58 59 | 2737 | 61 23 8 | 2745 |
| 19 | α Arietis | W. | 58 32 24 | 2852 | 60 5 45 | 2857 | 61 38 59 | 2863 | 63 12 5 | 2869 |
| | Aldebaran | W. | 28 28 50 | 2985 | 29 59 22 | 2974 | 31 30 7 | 2965 | 33 1 3 | 2958 |
| | Regulus | E. | 53 26 42 | 2788 | 51 52 0 | 2798 | 50 17 29 | 2806 | 48 43 9 | 2815 |
| | Mars | E. | 100 34 48 | 2885 | 99 2 10 | 2894 | 97 29 43 | 2901 | 95 57 26 | 2909 |
| 20 | α Arietis | W. | 70 55 39 | 2901 | 72 27 57 | 2907 | 74 0 7 | 2914 | 75 32 8 | 2921 |
| | Aldebaran | W. | 40 37 4 | 2950 | 42 8 20 | 2951 | 43 39 34 | 2953 | 45 10 46 | 2955 |
| | Regulus | E. | 40 54 24 | 2861 | 39 21 15 | 2870 | 37 48 18 | 2880 | 36 15 33 | 2890 |
| | Mars | E. | 88 18 28 | 2948 | 86 47 10 | 2957 | 85 16 3 | 2964 | 83 45 5 | 2972 |
| | Spica | E. | 94 52 41 | 2841 | 93 19 6 | 2848 | 91 45 41 | 2857 | 90 12 27 | 2864 |
| 21 | α Arietis | W. | 83 9 59 | 2956 | 84 41 7 | 2964 | 86 12 5 | 2971 | 87 42 54 | 2977 |
| | Aldebaran | W. | 52 45 47 | 2174 | 54 16 32 | 2979 | 55 47 11 | 2984 | 57 17 44 | 2988 |
| | Saturn | W. | 36 0 25 | 2929 | 37 32 7 | 2933 | 39 3 44 | 2938 | 40 35 15 | 2942 |
| | Mars | E. | 76 12 40 | 3009 | 74 42 39 | 3017 | 73 12 47 | 3024 | 71 43 4 | 3031 |
| | Spica | E. | 82 28 42 | 2902 | 80 56 26 | 2910 | 79 24 20 | 2917 | 77 52 23 | 2925 |
| 22 | α Arietis | W. | 95 14 47 | 3014 | 96 44 43 | 3021 | 98 14 30 | 3028 | 99 44 8 | 3035 |
| | Aldebaran | W. | 64 48 55 | 3015 | 66 18 49 | 3021 | 67 48 36 | 3026 | 69 18 16 | 3032 |
| | Saturn | W. | 48 11 18 | 2968 | 49 42 11 | 2974 | 51 12 56 | 2980 | 52 43 34 | 2985 |
| | Mars | E. | 64 16 46 | 3067 | 62 47 56 | 3074 | 61 19 15 | 3081 | 59 50 42 | 3087 |
| | Spica | E. | 70 14 59 | 2961 | 68 43 57 | 2968 | 67 13 4 | 2974 | 65 42 19 | 2981 |
| 23 | Aldebaran | W. | 76 44 55 | 3059 | 78 13 55 | 3064 | 79 42 49 | 3069 | 81 11 36 | 3074 |
| | Saturn | W. | 60 15 6 | 3011 | 61 45 5 | 3017 | 63 14 57 | 3022 | 64 44 43 | 3026 |
| | Pollux | W. | 32 39 16 | 3013 | 34 9 13 | 3018 | 35 39 3 | 3024 | 37 8 46 | 3029 |
| | Mars | E. | 52 29 52 | 3118 | 51 2 4 | 3124 | 49 34 23 | 3129 | 48 6 48 | 3135 |
| | Spica | E. | 58 10 41 | 3013 | 56 40 44 | 3019 | 55 10 55 | 3025 | 53 41 13 | 3030 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 24 | Aldebaran | W. | 82 40 17 | 3079 | 84 8 52 | 3063 | 85 37 22 | 3069 | 87 5 45 | 3092 |
| | Saturn | W. | 66 14 23 | 3031 | 67 43 57 | 3036 | 69 13 25 | 3041 | 70 42 47 | 3044 |
| | Pollux | W. | 38 38 23 | 3034 | 40 7 54 | 3039 | 41 37 19 | 3843 | 43 6 48 | 3047 |
| | Mars | E. | 46 39 21 | 3140 | 45 12 0 | 3145 | 43 44 45 | 3150 | 42 17 36 | 3154 |
| | Spica | E. | 52 11 38 | 3036 | 50 42 10 | 3042 | 49 12 49 | 3047 | 47 43 34 | 3052 |
| | Antares | E. | 98 3 34 | 3030 | 96 33 58 | 3035 | 95 4 29 | 3040 | 93 35 6 | 3045 |
| | Venus | E. | 110 56 18 | 3510 | 109 36 5 | 3515 | 108 15 57 | 3520 | 106 55 55 | 3526 |
| 25 | Aldebaran | W. | 94 26 27 | 3113 | 95 54 21 | 2115 | 97 22 12 | 3119 | 98 49 58 | 3122 |
| | Saturn | W. | 78 8 28 | 3063 | 79 37 23 | 3065 | 81 6 15 | 3068 | 82 35 0 | 3070 |
| | Pollux | W. | 50 32 3 | 3065 | 52 0 55 | 3069 | 53 29 43 | 3071 | 54 58 28 | 3072 |
| | Regulus | W. | 14 24 32 | 3214 | 15 50 25 | 3194 | 17 16 42 | 3176 | 18 43 20 | 3163 |
| | Mars | E. | 35 3 8 | 3174 | 33 36 28 | 3178 | 32 9 52 | 3081 | 30 43 20 | 3158 |
| | Spica | E. | 40 18 44 | 3073 | 38 50 2 | 3077 | 37 21 24 | 3081 | 35 52 51 | 3083 |
| | Antares | E. | 86 9 27 | 3064 | 84 40 33 | 3066 | 83 11 42 | 3069 | 81 42 55 | 3072 |
| | Venus | E. | 100 17 0 | 3545 | 98 57 26 | 3549 | 97 37 56 | 3552 | 96 18 29 | 3556 |
| 26 | Aldebaran | W. | 106 8 5 | 3133 | 107 35 35 | 3133 | 109 3 5 | 3135 | 110 30 31 | 3136 |
| | Saturn | W. | 89 58 30 | 3078 | 91 27 6 | 3078 | 92 55 42 | 3078 | 94 24 18 | 3078 |
| | Pollux | W. | 62 21 40 | 3080 | 63 50 14 | 3081 | 65 18 47 | 3081 | 66 47 20 | 3080 |
| | Regulus | W. | 25 59 27 | 3128 | 27 27 3 | 3124 | 28 54 44 | 3120 | 30 22 29 | 3116 |
| | Spica | E. | 28 31 0 | 3098 | 27 2 48 | 3101 | 25 34 39 | 3104 | 24 6 32 | 3107 |
| | Antares | E. | 74 19 36 | 3079 | 72 51 1 | 3079 | 71 22 27 | 3080 | 69 53 53 | 3079 |
| | Venus | E. | 89 41 51 | 3564 | 88 22 37 | 3564 | 87 3 23 | 3565 | 85 44 10 | 3564 |
| 27 | Pollux | W. | 74 10 22 | 3073 | 75 39 5 | 3070 | 77 7 51 | 3067 | 78 36 41 | 3064 |
| | Regulus | W. | 37 42 24 | 3097 | 39 10 37 | 3093 | 40 38 55 | 3088 | 42 7 19 | 3083 |
| | Antares | E. | 62 30 45 | 3073 | 61 2 2 | 3070 | 59 33 15 | 3066 | 58 4 24 | 3064 |
| | Venus | E. | 79 7 51 | 3557 | 77 48 30 | 3555 | 76 29 6 | 3552 | 75 9 39 | 3548 |
| | Sun | E. | 121 15 45 | 3486 | 119 55 4 | 3481 | 118 34 19 | 3476 | 117 13 30 | 3472 |
| 28 | Pollux | W. | 86 2 6 | 3039 | 87 31 30 | 3033 | 89 1 2 | 3026 | 90 30 42 | 3020 |
| | Regulus | W. | 49 30 55 | 3055 | 51 0 0 | 3048 | 52 29 13 | 3041 | 53 58 35 | 3033 |
| | Antares | E. | 50 39 0 | 3039 | 49 9 36 | 3033 | 47 40 4 | 3027 | 46 10 25 | 3020 |
| | Venus | E. | 68 31 18 | 3524 | 67 11 20 | 3518 | 65 51 16 | 3512 | 64 31 5 | 3506 |
| | Sun | E. | 110 27 57 | 3445 | 109 6 31 | 3438 | 107 44 57 | 3430 | 106 23 14 | 3422 |
| 29 | Pollux | W. | 98 1 24 | 2977 | 99 32 5 | 2968 | 101 2 58 | 2958 | 102 34 4 | 2946 |
| | Regulus | W. | 61 28 1 | 2989 | 62 58 28 | 2979 | 64 29 7 | 2969 | 65 59 59 | 2957 |
| | Antares | E. | 38 39 48 | 2979 | 37 9 9 | 2969 | 35 38 17 | 2959 | 34 7 13 | 2948 |
| | Venus | E. | 57 48 2 | 3463 | 56 26 57 | 3454 | 55 5 41 | 3444 | 53 44 14 | 3432 |
| | Sun | E. | 99 32 13 | 3374 | 98 9 27 | 3364 | 96 46 29 | 3352 | 95 23 18 | 3341 |
| 30 | Regulus | W. | 73 38 2 | 2897 | 75 10 25 | 2883 | 76 43 6 | 2868 | 78 16 6 | 2854 |
| | Mars | W. | 23 25 33 | 2985 | 24 56 4 | 2970 | 26 26 54 | 2955 | 27 58 3 | 2939 |
| | Spica | W. | 19 37 46 | 2921 | 21 9 38 | 2903 | 22 41 53 | 2886 | 24 14 30 | 2869 |
| | Antares | E. | 26 28 25 | 2891 | 24 55 55 | 2878 | 23 23 8 | 2866 | 21 50 5 | 2852 |
| | Venus | E. | 46 53 52 | 3376 | 45 31 8 | 3364 | 44 8 10 | 3351 | 42 44 58 | 3339 |
| | Sun | E. | 88 23 50 | 3276 | 86 59 10 | 3260 | 85 34 12 | 3245 | 84 8 56 | 3230 |
| 31 | Regulus | W. | 86 5 45 | 2778 | 87 40 42 | 2763 | 89 15 59 | 2746 | 90 51 38 | 2729 |
| | Mars | W. | 35 38 54 | 2857 | 37 12 8 | 2840 | 38 45 44 | 2823 | 40 19 42 | 2805 |
| | Spica | W. | 32 3 7 | 2783 | 33 37 57 | 2766 | 35 13 10 | 2748 | 36 48 46 | 2730 |
| | Venus | E. | 35 45 21 | 3276 | 34 20 42 | 3265 | 32 55 50 | 3254 | 31 30 45 | 3243 |
| | Sun | E. | 76 57 59 | 3148 | 75 30 48 | 3131 | 74 3 16 | 3113 | 72 35 22 | 3095 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ′ | | ° ′ ″ | |
| 24 | Aldebaran | W. | 88 34 4 | 3097 | 90 2 17 | 3101 | 91 30 25 | 3105 | 92 58 28 | 3109 |
| | Saturn | W. | 72 12 5 | 3048 | 73 41 18 | 3052 | 75 10 26 | 3056 | 76 39 29 | 3060 |
| | Pollux | W. | 44 35 53 | 3052 | 46 5 2 | 3055 | 47 34 7 | 3059 | 49 3 7 | 3062 |
| | Mars | E. | 40 50 32 | 3158 | ·39 23 33 | 3163 | 37 56 40 | 3168 | 36 29 52 | 3171 |
| | Spica | E. | 46 14 25 | 3056 | 44 45 22 | 3060 | 43 16 24 | 3065 | 41 47 31 | 3069 |
| | Antares | E. | 92 5 49 | 3049 | 90 36 36 | 3053 | 89 7 28 | 3056 | 87 38 25 | 3060 |
| | Venus | E. | 105 35 59 | 3529 | 104 16 7 | 3534 | 102 56 20 | 3538 | 101 36 38 | 3542 |
| 25 | Aldebaran | W. | 100 17 41 | 3126 | 101 45 20 | 3127 | 103 12 57 | 3129 | 104 40 32 | 3130 |
| | Saturn | W. | 84 3 50 | 3073 | 85 32 33 | 3074 | 87 1 14 | 3077 | 88 29 52 | 3077 |
| | Pollux | W. | 56 27 11 | 3075 | 57 55 51 | 3077 | 59 24 29 | 3078 | 60 53 5 | 3079 |
| | Regulus | W. | 20 10 13 | 3153 | 21 37 19 | 3145 | 23 4 34 | 3138 | 24 31 57 | 3133 |
| | Mars | E. | 29 16 51 | 3186 | 27 50 25 | 3188 | 26 24 2 | 3191 | 24 57 42 | 3193 |
| | Spica | E. | 34 24 21 | 3087 | 32 55 55 | 3090 | 31 27 33 | 3093 | 29 59 15 | 3096 |
| | Antares | E. | 80 14 11 | 3074 | 78 45 30 | 3075 | 77 16 50 | 3077 | 75 48 12 | 3078 |
| | Venus | E. | 94 59 5 | 3557 | 93 39 44 | 3559 | 92 20 25 | 3560 | 91 1 7 | 3562 |
| 26 | Aldebaran | W. | 111 57 57 | 3137 | 113 25 22 | 3136 | 114 52 45 | 3137 | 116 20 13 | 3136 |
| | Saturn | W. | 95 52 54 | 3078 | 97 21 30 | 3077 | 98 50 8 | 3076 | 100 18 47 | 3074 |
| | Pollux | W. | 68 15 54 | 3080 | 69 44 28 | 3078 | 71 13 4 | 3077 | 72 41 42 | 3075 |
| | Regulus | W. | 31 50 19 | 3113 | 33 18 13 | 3109 | 34 46 12 | 3105 | 36 14 16 | 3101 |
| | Spica | E. | 22 38 29 | 3109 | 21 10 30 | 3114 | 19 42 37 | 3118 | 18 14 49 | 3122 |
| | Antares | E. | 68 25 18 | 3078 | 66 56 43 | 3077 | 65 28 5 | 3076 | 63 59 26 | 3074 |
| | Venus | E. | 84 24 56 | 3564 | 83 5 42 | 3563 | 81 46 27 | 3561 | 80 27 10 | 3559 |
| 27 | Pollux | W. | 80 5 35 | 3060 | 81 34 34 | 3055 | 83 3 39 | 3051 | 84 32 49 | 3045 |
| | Regulus | W. | 43 35 49 | 3078 | 45 4 22 | 3073 | 46 33 8 | 3067 | 48 1 58 | 3061 |
| | Antares | E. | 56 35 31 | 3060 | 55 6 33 | 3055 | 53 37 28 | 3050 | 52 8 17 | 3045 |
| | Venus | E. | 73 50 8 | 3545 | 72 30 34 | 3540 | 71 10 54 | 3535 | 69 51 9 | 3530 |
| | Sun | E. | 115 52 35 | 3468 | 114 31 35 | 3463 | 113 10 29 | 3457 | 111 49 17 | 3450 |
| 28 | Pollux | W. | 92 0 30 | 3012 | 93 30 28 | 3004 | 95 0 36 | 2996 | 96 30 54 | 2987 |
| | Regulus | W. | 55 28 7 | 3025 | 56 57 49 | 3016 | 58 27 42 | 3007 | 59 57 46 | 2998 |
| | Antares | E. | 44 40 37 | 3013 | 43 10 40 | 3005 | 41 40 33 | 2997 | 40 10 16 | 2988 |
| | Venus | E. | 63 10 47 | 3497 | 61 50 20 | 3488 | 60 29 45 | 3480 | 59 8 57 | 3472 |
| | Sun | E. | 105 1 22 | 3414 | 103 39 21 | 3404 | 102 17 9 | 3396 | 100 54 47 | 3385 |
| 29 | Pollux | W. | 104 5 24 | 2935 | 105 36 58 | 2924 | 107 8 46 | 2912 | 108 40 49 | 2900 |
| | Regulus | W. | 67 31 6 | 2946 | 69 2 27 | 2934 | 70 34 3 | 2921 | 72 5 55 | 2909 |
| | Antares | E. | 32 35 55 | 2938 | 31 4 24 | 2927 | 29 32 39 | 2915 | 28 0 39 | 2903 |
| | Venus | E. | 52 22 34 | 3422 | 51 0 42 | 3411 | 49 38 38 | 3400 | 48 16 22 | 3388 |
| | Sun | E. | 93 59 54 | 3329 | 92 36 16 | 3316 | 91 12 23 | 3302 | 89 48 14 | 3289 |
| 30 | Regulus | W. | 79 49 24 | 2840 | 81 23 0 | 2825 | 82 56 58 | 2810 | 84 31 9 | 2794 |
| | Mars | W. | 29 29 32 | 2924 | 31 1 21 | 2907 | 32 33 31 | 2891 | 34 6 2 | 2874 |
| | Spica | W. | 25 47 29 | 2852 | 27 20 50 | 2835 | 28 54 33 | 2817 | 30 28 39 | 2800 |
| | Antares | E. | 20 16 45 | 2839 | 18 43 8 | 2827 | 17 9 15 | 2815 | 15 35 6 | 2801 |
| | Venus | E. | 41 21 32 | 3326 | 39 57 51 | 3314 | 38 33 56 | 3301 | 37 9 46 | 3288 |
| | Sun | E. | 82 43 22 | 3214 | 81 18 30 | 3198 | 79 51 19 | 3183 | 78 24 49 | 3166 |
| 31 | Regulus | W. | 92 27 40 | 2712 | 94 4 4 | 2694 | 95 40 52 | 2677 | 97 18 3 | 2659 |
| | Mars | W. | 41 54 4 | 2787 | 43 28 49 | 2768 | 45 3 59 | 2750 | 46 39 33 | 2731 |
| | Spica | W. | 38 24 46 | 2713 | 40 1 9 | 2695 | 41 37 56 | 2676 | 43 15 8 | 2657 |
| | Venus | E. | 30 5 27 | 3233 | 28 39 57 | 3225 | 27 14 18 | 7219 | 25 48 31 | 3214 |
| | Sun | E. | 71 7 6 | 3077 | 69 38 28 | 3058 | 68 9 27 | 3039 | 66 40 3 | 3021 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be added to Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semi-diameter. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Fri. | 1 | 20 57 24.97 | 10.206 | S.17 14 23.6 | 42.84 | 16 16.07 | 68.32 | 13 49.20 | 0.349 |
| Sat. | 2 | 21 1 29.52 | 10.172 | 16 57 17.9 | 43.10 | 16 15.92 | 68.21 | 13 57.18 | 0.316 |
| *Sun.* | 3 | 21 5 33.26 | 10.139 | 16 39 54.3 | 43.83 | 16 15.76 | 68.09 | 14 4.33 | 0.282 |
| Mon. | 4 | 21 9 36.17 | 10.105 | 16 22 13.0 | 44.57 | 16 15.60 | 67.97 | 14 10.66 | 0.248 |
| Tues. | 5 | 21 13 38.28 | 10.071 | 16 4 14.8 | 45.25 | 16 15.44 | 67.86 | 14 16.21 | 0.214 |
| Wed. | 6 | 21 17 39.56 | 10.037 | 15 46 0.1 | 45.94 | 16 15.27 | 67.74 | 14 20.93 | 0.180 |
| Thur. | 7 | 21 21 40.03 | 10.004 | 15 27 29.2 | 46.60 | 16 15.10 | 67.63 | 14 24.84 | 0.147 |
| Fri. | 8 | 21 25 39.69 | 9.971 | 15 8 42.5 | 47.26 | 16 14.92 | 67.52 | 14 27.92 | 0.113 |
| Sat. | 9 | 21 29 38.53 | 9.937 | 14 49 40.5 | 47.88 | 16 14.74 | 67.41 | 14 30.20 | 0.079 |
| *Sun.* | 10 | 21 33 36.59 | 9.903 | 14 30 23.7 | 48.50 | 16 14.56 | 67.30 | 14 31.71 | 0.046 |
| Mon. | 11 | 21 37 33.84 | 9.869 | 14 10 52.2 | 49.09 | 16 14.38 | 67.19 | 14 32.41 | 0.013 |
| Tues. | 12 | 21 41 30.30 | 9.835 | 13 51 7.0 | 49.66 | 16 14.20 | 67.08 | 14 32.30 | 0.020 |
| Wed. | 13 | 21 45 25.94 | 9.803 | 13 31 8.0 | 50.21 | 16 14.01 | 66.97 | 14 31.39 | 0.053 |
| Thur. | 14 | 21 49 20.80 | 9.772 | 13 10 56.1 | 50.76 | 16 13.82 | 66.86 | 14 29.69 | 0.085 |
| Fri. | 15 | 21 53 14.93 | 9.740 | 12 50 31.5 | 51.27 | 16 13.63 | 66.75 | 14 27.27 | 0.117 |
| Sat. | 16 | 21 57 8.29 | 9.709 | 12 29 54.5 | 51.78 | 16 13.43 | 66.65 | 14 24.08 | 0.148 |
| *Sun.* | 17 | 22 1 0.92 | 9.677 | 12 9 5.7 | 52.26 | 16 13.23 | 66.55 | 14 20.17 | 0.179 |
| Mon. | 18 | 22 4 52.81 | 9.648 | 11 48 5.4 | 52.74 | 16 13.02 | 66.46 | 14 15.51 | 0.208 |
| Tues. | 19 | 22 8 44.01 | 9.619 | 11 26 54.1 | 53.18 | 16 12.81 | 66.36 | 14 10.18 | 0.237 |
| Wed. | 20 | 22 12 34.52 | 9.592 | 11 5 32.1 | 53.63 | 16 12.59 | 66.26 | 14 4.14 | 0.265 |
| Thur. | 21 | 22 16 24.36 | 9.564 | 10 43 59.9 | 54.04 | 16 12.37 | 66.16 | 13 57.46 | 0.293 |
| Fri. | 22 | 22 20 13.54 | 9.537 | 10 22 17.7 | 54.45 | 16 12.14 | 66.07 | 13 50.09 | 0.320 |
| Sat. | 23 | 22 24 2.10 | 9.512 | 10 0 26.0 | 54.83 | 16 11.91 | 65.97 | 13 42.13 | 0.345 |
| *Sun.* | 24 | 22 27 50.05 | 9.487 | 9 38 25.0 | 55.22 | 16 11.67 | 65.87 | 13 33.54 | 0.369 |
| Mon. | 25 | 22 31 37.40 | 9.462 | 9 16 15.5 | 55.57 | 16 11.44 | 65.78 | 13 24.36 | 0.394 |
| Tues. | 26 | 22 35 24.17 | 9.438 | 8 53 57.5 | 55.92 | 16 11.20 | 65.69 | 13 14.61 | 0.418 |
| Wed. | 27 | 22 39 10.39 | 9.415 | 8 31 31.6 | 56.24 | 16 10.96 | 65.61 | 13 4.29 | 0.441 |
| Thur. | 28 | 22 42 56.07 | 9.393 | 8 8 58.0 | 56.56 | 16 10.71 | 65.54 | 12 53.45 | 0.463 |
| Fri. | 29 | 22 46 41.23 | 9.373 | 7 46 17.1 | 56.84 | 16 10.47 | 65.47 | 12 42.10 | 0.484 |
| Sat. | 30 | 22 50 25.89 | 9.352 | S. 7 23 29.5 | 57.12 | 16 10.22 | 65.39 | 12 30.23 | 0.505 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S Apparent Right Ascension. | | | Diff. for 1 hour. | Apparent Declination. | | | Diff. for 1 hour. | Equation of Time, to be subtracted from Mean Time. | | Diff. for 1 hour. | Sidereal Time. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | h. | m. | s. | s. | ° | ′ | ″ | ″ | m. | s. | s. | h. | m. | s. |
| Fri. | 1 | 20 | 57 | 22.63 | 10.206 | S.17 | 14 | 33.2 | 42.34 | 13 | 49.12 | 0.349 | 20 | 43 | 33.51 |
| Sat. | 2 | 21 | 1 | 27.17 | 10.172 | 16 | 57 | 27.8 | 43.10 | 13 | 57.11 | 0.316 | 20 | 47 | 30.06 |
| *Sun.* | 3 | 21 | 5 | 30.89 | 10.139 | 16 | 40 | 4.5 | 43.83 | 14 | 4.27 | 0.282 | 20 | 51 | 26.62 |
| Mon. | 4 | 21 | 9 | 33.79 | 10.105 | 16 | 22 | 23.5 | 44.57 | 14 | 10.61 | 0.248 | 20 | 55 | 23.18 |
| Tues. | 5 | 21 | 13 | 35.90 | 10.071 | 16 | 4 | 25.5 | 45.25 | 14 | 16.17 | 0.214 | 20 | 59 | 19.73 |
| Wed. | 6 | 21 | 17 | 37.18 | 10.037 | 15 | 46 | 11.0 | 45.94 | 14 | 20.89 | 0.180 | 21 | 3 | 16.29 |
| Thur. | 7 | 21 | 21 | 37.65 | 10.004 | 15 | 27 | 40.3 | 46.60 | 14 | 24.81 | 0.147 | 21 | 7 | 12.84 |
| Fri. | 8 | 21 | 25 | 37.30 | 9.971 | 15 | 8 | 53.8 | 47.26 | 14 | 27.90 | 0.113 | 21 | 11 | 9.40 |
| Sat. | 9 | 21 | 29 | 36.14 | 9.937 | 14 | 49 | 52.0 | 47.88 | 14 | 30.18 | 0.079 | 21 | 15 | 5.96 |
| *Sun.* | 10 | 21 | 33 | 34.21 | 9.903 | 14 | 30 | 35.3 | 48.50 | 14 | 31.69 | 0.046 | 21 | 19 | 2.52 |
| Mon. | 11 | 21 | 37 | 31.47 | 9.869 | 14 | 11 | 4.0 | 49.09 | 14 | 32.40 | 0.013 | 21 | 22 | 59.07 |
| Tues. | 12 | 21 | 41 | 27.93 | 9.835 | 13 | 51 | 18.9 | 49.66 | 14 | 32.30 | 0.020 | 21 | 26 | 55.63 |
| Wed. | 13 | 21 | 45 | 23.58 | 9.803 | 13 | 31 | 20.1 | 50.21 | 14 | 31.40 | 0.053 | 21 | 30 | 52.18 |
| Thur. | 14 | 21 | 49 | 18.45 | 9.772 | 13 | 11 | 8.3 | 50.76 | 14 | 29.71 | 0.085 | 21 | 34 | 48.74 |
| Fri. | 15 | 21 | 53 | 12.59 | 9.740 | 12 | 50 | 43.7 | 51.27 | 14 | 27.30 | 0.117 | 21 | 38 | 45.29 |
| Sat. | 16 | 21 | 57 | 5.97 | 9.709 | 12 | 30 | 6.8 | 51.78 | 14 | 24.12 | 0.148 | 21 | 42 | 41.85 |
| *Sun.* | 17 | 22 | 0 | 58.62 | 9.677 | 12 | 9 | 18.1 | 52.26 | 14 | 20.22 | 0.179 | 21 | 46 | 38.40 |
| Mon. | 18 | 22 | 4 | 50.53 | 9.648 | 11 | 48 | 17.9 | 52.74 | 14 | 15.57 | 0.208 | 21 | 50 | 34.96 |
| Tues. | 19 | 22 | 8 | 41.75 | 9.619 | 11 | 27 | 6.7 | 53.18 | 14 | 10.24 | 0.237 | 21 | 54 | 31.51 |
| Wed. | 20 | 22 | 12 | 32.28 | 9.592 | 11 | 5 | 44.7 | 53.63 | 14 | 4.21 | 0.265 | 21 | 58 | 28.07 |
| Thur. | 21 | 22 | 16 | 22.15 | 9.564 | 10 | 44 | 12.4 | 54.04 | 13 | 57.53 | 0.293 | 22 | 2 | 24.62 |
| Fri. | 22 | 22 | 20 | 11.35 | 9.537 | 10 | 22 | 30.2 | 54.45 | 13 | 50.17 | 0.320 | 22 | 6 | 21.18 |
| Sat. | 23 | 22 | 23 | 59.94 | 9.512 | 10 | 0 | 38.5 | 54.83 | 13 | 42.21 | 0.345 | 22 | 10 | 17.73 |
| *Sun.* | 24 | 22 | 27 | 47.91 | 9.487 | 9 | 38 | 37.5 | 55.22 | 13 | 33.63 | 0.369 | 22 | 14 | 14.28 |
| Mon. | 25 | 22 | 31 | 35.29 | 9.462 | 9 | 16 | 27.9 | 55.57 | 13 | 24.45 | 0.394 | 22 | 18 | 10.84 |
| Tues. | 26 | 22 | 35 | 22.10 | 9.438 | 8 | 54 | 9.8 | 55.92 | 13 | 14.71 | 0.418 | 22 | 22 | 7.39 |
| Wed. | 27 | 22 | 39 | 8.34 | 9.415 | 8 | 31 | 43.8 | 56:24 | 13 | 4.39 | 0.441 | 22 | 26 | 3.95 |
| Thur. | 28 | 22 | 42 | 54.05 | 9.393 | 8 | 9 | 10.1 | 56.56 | 12 | 53.55 | 0.463 | 22 | 30 | 0.50 |
| Fri. | 29 | 22 | 46 | 39.25 | 9.373 | 7 | 46 | 29.1 | 56.84 | 12 | 42.20 | 0.484 | 22 | 33 | 57.05 |
| Sat. | 30 | 22 | 50 | 23.95 | 9.352 | S. 7 | 23 | 41.4 | 57.12 | 12 | 30.34 | 0.505 | 22 | 37 | 53.61 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S True LONGITUDE. λ |  |  | λ′ |  | Diff. for 1 hour. | LATITUDE. | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | ° | ′ | ″ | ′ | ″ | ″ | ″ |  |  | h. | m. | s. |
| 1 | 32 | 311 | 53 | 4.0 | 53 | 6.3 | 152.21 | —0.48 | 9.9937023 | 28.6 | 3 | 15 | 54.30 |
| 2 | 33 | 312 | 53 | 56.7 | 53 | 58.8 | 152.17 | 0.56 | .9937716 | 29.2 | 3 | 11 | 58.40 |
| 3 | 34 | 313 | 54 | 48.5 | 54 | 50.5 | 152.13 | 0.64 | .9938422 | 29.7 | 3 | 8 | 2.49 |
| 4 | 35 | 314 | 55 | 39.3 | 55 | 41.1 | 152.09 | 0.66 | .9939142 | 30.2 | 3 | 4 | 6.57 |
| 5 | 36 | 315 | 56 | 29.0 | 56 | 30.6 | 152.04 | 0.67 | .9939875 | 30.8 | 3 | 0 | 10.67 |
| 6 | 37 | 316 | 57 | 17.4 | 57 | 18.9 | 151.99 | 0.64 | .9940619 | 31.3 | 2 | 56 | 14.76 |
| 7 | 38 | 317 | 58 | 4.5 | 58 | 5.9 | 151.93 | 0.57 | .9941377 | 31.8 | 2 | 52 | 18.85 |
| 8 | 39 | 318 | 58 | 50.2 | 58 | 51.4 | 151.87 | 0.50 | .9942148 | 32.3 | 2 | 48 | 22.94 |
| 9 | 40 | 319 | 59 | 34.5 | 59 | 35.6 | 151.81 | 0.40 | .9942930 | 32.8 | 2 | 44 | 27.02 |
| 10 | 41 | 321 | 0 | 17.3 | 0 | 18.3 | 151.75 | 0.27 | .9943725 | 33.3 | 2 | 40 | 31.11 |
| 11 | 42 | 322 | 0 | 58.5 | 0 | 59.4 | 151.68 | 0.14 | .9944531 | 33.9 | 2 | 36 | 35.20 |
| 12 | 43 | 323 | 1 | 38.0 | 1 | 38.8 | 151.61 | —0.01 | .9945353 | 34.6 | 2 | 32 | 39.29 |
| 13 | 44 | 324 | 2 | 15.8 | 2 | 16.4 | 151.54 | +0.12 | .9946190 | 35.3 | 2 | 28 | 43.38 |
| 14 | 45 | 325 | 2 | 51.9 | 2 | 52.4 | 151.47 | 0.24 | .9947043 | 36.0 | 2 | 24 | 47.47 |
| 15 | 46 | 326 | 3 | 26.1 | 3 | 26.5 | 151.40 | 0.32 | .9947913 | 36.6 | 2 | 20 | 51.58 |
| 16 | 47 | 327 | 3 | 58.5 | 3 | 58.8 | 151.33 | 0.39 | .9948801 | 37.3 | 2 | 16 | 55.66 |
| 17 | 48 | 328 | 4 | 29.2 | 4 | 29.3 | 151.26 | 0.43 | .9949707 | 38.1 | 2 | 12 | 59.76 |
| 18 | 49 | 329 | 4 | 58.0 | 4 | 58.0 | 151.18 | 0.46 | .9950629 | 38.9 | 2 | 9 | 3.84 |
| 19 | 50 | 330 | 5 | 25.1 | 5 | 24.9 | 151.10 | 0.44 | .9951579 | 39.7 | 2 | 5 | 7.93 |
| 20 | 51 | 331 | 5 | 50.5 | 5 | 50.1 | 151.02 | 0.40 | .9952546 | 40.6 | 2 | 1 | 12.02 |
| 21 | 52 | 332 | 6 | 14.3 | 6 | 13.8 | 150.95 | 0.31 | .9953531 | 41.4 | 1 | 57 | 16.11 |
| 22 | 53 | 333 | 6 | 36.5 | 6 | 35.9 | 150.89 | 0.22 | .9954538 | 42.1 | 1 | 53 | 20.20 |
| 23 | 54 | 334 | 6 | 57.1 | 6 | 56.4 | 150.83 | +0.11 | .9955563 | 42.9 | 1 | 49 | 24.29 |
| 24 | 55 | 335 | 7 | 16.2 | 7 | 15.4 | 150.77 | —0.02 | .9956606 | 43.7 | 1 | 45 | 28.40 |
| 25 | 56 | 336 | 7 | 33.8 | 7 | 32.9 | 150.71 | 0.18 | .9957665 | 44.5 | 1 | 41 | 32.48 |
| 26 | 57 | 337 | 7 | 49.8 | 7 | 48.8 | 150.65 | 0.31 | .9958740 | 45.2 | 1 | 37 | 36.57 |
| 27 | 58 | 338 | 8 | 4.3 | 8 | 3.1 | 150.59 | 0.43 | .9959829 | 45.7 | 1 | 33 | 40.66 |
| 28 | 59 | 339 | 8 | 17.3 | 8 | 15.9 | 150.53 | 0.55 | .9960931 | 46.2 | 1 | 29 | 44.76 |
| 29 | 60 | 340 | 8 | 28.9 | 8 | 27.4 | 150.47 | 0.64 | .9962046 | 46.6 | 1 | 25 | 48.85 |
| 30 | 61 | 341 | 8 | 39.0 | 8 | 37.4 | 150.40 | —0.71 | 9.9963169 | 47.0 | 1 | 21 | 52.94 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. |  | HORIZONTAL PARALLAX. |  |  |  | MERIDIAN PASSAGE. |  | AGE. |
|---|---|---|---|---|---|---|---|---|---|
|  | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. |  | Diff. for 1 hour. |  |
|  | ′ ″ | ′ ″ | ′ ″ | ′ | ′ ″ | ″ | h m. | m. | d. |
| 1 | 15 32.8 | 15 40.3 | 56 56.7 | +2.25 | 57 24.3 | +2.34 | 20 19.2 | 2.40 | 24.5 |
| 2 | 15 48.0 | 15 55.8 | 57 52.7 | 2.37 | 58 21.3 | 2.37 | 21 19.2 | 2.56 | 25.5 |
| 3 | 16 3.5 | 16 10.9 | 58 49.5 | 2.32 | 59 16.7 | 2.20 | 22 21.9 | 2.59 | 26.5 |
| 4 | 16 17.8 | 16 24.1 | 59 42.1 | 2.02 | 60 5.1 | 1.80 | 23 24.5 | 2.56 | 27.5 |
| 5 | 16 29.6 | 16 34.0 | 60 25.1 | 1.52 | 60 41.5 | 1.20 | 6 |  | 28.5 |
| 6 | 16 37.3 | 16 39.5 | 60 53.8 | 0.84 | 61 1.7 | +0.47 | 0 24.7 | 2.43 | 0.1 |
| 7 | 16 40.4 | 16 40.1 | 61 5.0 | +0.08 | 61 3.7 | −0.29 | 1 21.2 | 2.28 | 1.1 |
| 8 | 16 38.5 | 16 35.8 | 60 58.0 | −0.65 | 60 48.1 | 0.98 | 2 14.3 | 2.16 | 2.1 |
| 9 | 16 32.1 | 16 27.5 | 60 34.4 | 1.27 | 60 17.5 | 1.52 | 3 5.0 | 2.09 | 3.1 |
| 10 | 16 22.2 | 16 16.3 | 59 58.0 | 1.72 | 59 36.5 | 1.86 | 3 54.5 | 2.07 | 4.1 |
| 11 | 16 10.0 | 16 3.5 | 59 13.5 | 1.95 | 58 49.7 | 1.99 | 4 44.2 | 2.09 | 5.1 |
| 12 | 15 57.0 | 15 50.5 | 58 25.6 | 2.00 | 58 1.6 | 1.98 | 5 35.1 | 2.14 | 6.1 |
| 13 | 15 44.1 | 15 37.9 | 57 38.1 | 1.93 | 57 15.5 | 1.85 | 6 27.9 | 2.23 | 7.1 |
| 14 | 15 32.0 | 15 26.4 | 56 53.9 | 1.75 | 56 33.5 | 1.65 | 7 22.4 | 2.29 | 8.1 |
| 15 | 15 21.2 | 15 16.4 | 56 14.3 | 1.53 | 55 56.5 | 1.42 | 8 17.8 | 2.29 | 9.1 |
| 16 | 15 11.9 | 15 7.8 | 55 40.1 | 1.32 | 55 25.0 | 1.22 | 9 12.6 | 2.24 | 10.1 |
| 17 | 15 4.0 | 15 0.6 | 55 11.1 | 1.10 | 54 58.5 | 1.00 | 10 5.3 | 2.13 | 11.1 |
| 18 | 14 57.5 | 14 54.7 | 54 47.2 | 0.89 | 54 37.1 | 0.79 | 10 55.1 | 2.00 | 12.1 |
| 19 | 14 52.3 | 14 50.2 | 54 28.1 | 0.69 | 54 20.4 | 0.59 | 11 41.5 | 1.87 | 13.1 |
| 20 | 14 48.4 | 14 46.9 | 54 13.9 | 0.50 | 54 8.5 | 0.40 | 12 24.8 | 1.75 | 14.1 |
| 21 | 14 45.8 | 14 45.0 | 54 4.3 | 0.30 | 54 1.4 | −0.19 | 13 5.7 | 1.67 | 15.1 |
| 22 | 14 44.6 | 14 44.6 | 53 59.9 | −0.07 | 53 59.7 | +0.05 | 13 45.1 | 1.63 | 16.1 |
| 23 | 14 45.0 | 14 45.8 | 54 1.1 | +0.17 | 54 4.0 | 0.31 | 14 23.9 | 1.63 | 17.1 |
| 24 | 14 47.0 | 14 48.7 | 54 8.6 | 0.46 | 54 15.0 | 0.61 | 15 3.3 | 1.67 | 18.1 |
| 25 | 14 51.0 | 14 53.8 | 54 23.3 | 0.77 | 54 33.5 | 0.94 | 15 44.2 | 1.76 | 19.1 |
| 26 | 14 57.1 | 15 1.0 | 54 45.8 | 1.12 | 55 0.3 | 1.30 | 16 27.9 | 1.90 | 20.1 |
| 27 | 15 5.6 | 15 10.8 | 55 17.0 | 1.48 | 55 35.8 | 1.66 | 17 15.3 | 2.07 | 21.1 |
| 28 | 15 16.5 | 15 22.7 | 55 56.8 | 1.83 | 56 19.9 | 1.99 | 18 7.1 | 2.25 | 22.1 |
| 29 | 15 29.5 | 15 36.7 | 56 44.8 | 2.14 | 57 11.3 | 2.27 | 19 3.4 | 2.43 | 23.1 |
| 30 | 15 44.3 | 15 52.3 | 57 39.2 | +2.37 | 58 8.4 | +2.44 | 20 3.1 | 2.46 | 24.1 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | **FRIDAY 1.** | | | | | **SUNDAY 3.** | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 17 15.07 | 2.3253 | S.24 35 2.8 | 7.835 | 0 | 18 17 17.59 | 2.6421 | S.28 0 36.0 | 0.185 |
| 1 | 16 19 34.83 | 2.3334 | 24 42 49.2 | 7.712 | 1 | 18 19 56.23 | 2.6456 | 28 0 41.4 | 0.006 |
| 2 | 16 21 55.08 | 2.3415 | 24 50 28.2 | 7.587 | 2 | 18 22 35.09 | 2.6494 | 28 0 35.4 | 0.196 |
| 3 | 16 24 15.81 | 2.3496 | 24 57 59.6 | 7.459 | 3 | 18 25 14.16 | 2.6528 | 28 0 17.9 | 0.388 |
| 4 | 16 26 37.02 | 2.3575 | 25 5 23.3 | 7.330 | 4 | 18 27 53.43 | 2.6561 | 27 59 48.9 | 0.580 |
| 5 | 16 28 58.71 | 2.3656 | 25 12 39.2 | 7.199 | 5 | 18 30 32.89 | 2.6592 | 27 59 8.3 | 0.773 |
| 6 | 16 31 20.89 | 2.3736 | 25 19 47.2 | 7.067 | 6 | 18 33 12.53 | 2.6621 | 27 58 16.1 | 0.967 |
| 7 | 16 33 43.54 | 2.3815 | 25 26 47.2 | 6.933 | 7 | 18 35 52.34 | 2.6648 | 27 57 12.3 | 1.161 |
| 8 | 16 36 6.67 | 2.3894 | 25 33 39.2 | 6.799 | 8 | 18 38 32.31 | 2.6673 | 27 55 56.8 | 1.356 |
| 9 | 16 38 30.27 | 2.3973 | 25 40 23.1 | 6.662 | 9 | 18 41 12.42 | 2.6697 | 27 54 29.6 | 1.551 |
| 10 | 16 40 54.35 | 2.4052 | 25 46 58.7 | 6.523 | 10 | 18 43 52.67 | 2.6718 | 27 52 50.7 | 1.746 |
| 11 | 16 43 18.90 | 2.4130 | 25 53 25.9 | 6.383 | 11 | 18 46 33.04 | 2.6738 | 27 51 0.1 | 1.941 |
| 12 | 16 45 43.91 | 2.4208 | 25 59 44.7 | 6.242 | 12 | 18 49 13.53 | 2.6757 | 27 48 57.8 | 2.137 |
| 13 | 16 48 9.39 | 2.4285 | 26 5 54.9 | 6.098 | 13 | 18 51 54.12 | 2.6773 | 27 46 43.7 | 2.334 |
| 14 | 16 50 35.33 | 2.4362 | 26 11 56.5 | 5.954 | 14 | 18 54 34.81 | 2.6788 | 27 44 17.7 | 2.532 |
| 15 | 16 53 1.73 | 2.4438 | 26 17 49.4 | 5.808 | 15 | 18 57 15.58 | 2.6801 | 27 41 39.8 | 2.730 |
| 16 | 16 55 28.59 | 2.4514 | 26 23 33.4 | 5.660 | 16 | 18 58 56.42 | 2.6812 | 27 38 50.1 | 2.927 |
| 17 | 16 57 55.90 | 2.4589 | 26 29 8.5 | 5.511 | 17 | 19 2 37.32 | 2.6821 | 27 35 48.6 | 3.124 |
| 18 | 17 0 23.66 | 2.4663 | 26 34 34.7 | 5.360 | 18 | 19 5 18.27 | 2.6828 | 27 32 35.3 | 3.322 |
| 19 | 17 2 51.86 | 2.4737 | 26 39 51.7 | 5.207 | 19 | 19 7 59.26 | 2.6834 | 27 29 10.1 | 3.519 |
| 20 | 17 5 20.50 | 2.4810 | 26 44 59.5 | 5.053 | 20 | 19 10 40.28 | 2.6837 | 27 25 33.0 | 3.717 |
| 21 | 17 7 49.58 | 2.4882 | 26 49 58.0 | 4.897 | 21 | 19 13 21.31 | 2.6839 | 27 21 44.0 | 3.915 |
| 22 | 17 10 19.09 | 2.4954 | 26 54 47.1 | 4.739 | 22 | 19 16 2.35 | 2.6840 | 27 17 43.1 | 4.113 |
| 23 | 17 12 49.03 | 2.5025 | S.26 59 26.7 | 4.581 | 23 | 19 18 43.39 | 2.6839 | S.27 13 30.4 | 4.309 |
| | **SATURDAY 2.** | | | | | **MONDAY 4.** | | | |
| 0 | 17 15 19.39 | 2.5094 | S.27 3 56.8 | 4.421 | 0 | 19 21 24.42 | 2.6836 | S.27 9 6.0 | 4.506 |
| 1 | 17 17 50.16 | 2.5163 | 27 8 17.2 | 4.259 | 1 | 19 24 5.42 | 2.6830 | 27 4 29.7 | 4.703 |
| 2 | 17 20 21.34 | 2.5231 | 27 12 27.9 | 4.096 | 2 | 19 26 46.38 | 2.6823 | 26 59 41.6 | 4.900 |
| 3 | 17 22 52.93 | 2.5298 | 27 16 28.7 | 3.931 | 3 | 19 29 27.30 | 2.6814 | 26 54 41.6 | 5.097 |
| 4 | 17 25 24.92 | 2.5365 | 27 20 19.6 | 3.765 | 4 | 19 32 8.16 | 2.6804 | 26 49 29.8 | 5.293 |
| 5 | 17 27 57.31 | 2.5430 | 27 24 0.5 | 3.598 | 5 | 19 34 48.95 | 2.6792 | 26 44 6.4 | 5.488 |
| 6 | 17 30 30.09 | 2.5494 | 27 27 31.4 | 3.430 | 6 | 19 37 29.67 | 2.6779 | 26 38 31.2 | 5.683 |
| 7 | 17 33 3.24 | 2.5557 | 27 30 52.1 | 3.259 | 7 | 19 40 10.30 | 2.6763 | 26 32 44.3 | 5.878 |
| 8 | 17 35 36.77 | 2.5618 | 27 34 2.5 | 3.087 | 8 | 19 42 50.83 | 2.6746 | 26 26 45.8 | 6.073 |
| 9 | 17 38 10.66 | 2.5678 | 27 37 2.6 | 2.915 | 9 | 19 45 31.26 | 2.6728 | 26 20 35.6 | 6.267 |
| 10 | 17 40 44.91 | 2.5737 | 27 39 52.3 | 2.741 | 10 | 19 48 11.57 | 2.6708 | 26 14 13.8 | 6.459 |
| 11 | 17 43 19.51 | 2.5795 | 27 42 31.5 | 2.566 | 11 | 19 50 51.76 | 2.6687 | 26 7 40.5 | 6.651 |
| 12 | 17 45 54.45 | 2.5852 | 27 45 0.2 | 2.389 | 12 | 19 53 31.81 | 2.6663 | 26 0 55.7 | 6.843 |
| 13 | 17 48 29.73 | 2.5907 | 27 47 18.2 | 2.211 | 13 | 19 56 11.72 | 2.6638 | 25 53 59.4 | 7.033 |
| 14 | 17 51 5.34 | 2.5962 | 27 49 25.5 | 2.032 | 14 | 19 58 51.47 | 2.6612 | 25 46 51.7 | 7.223 |
| 15 | 17 53 41.27 | 2.6014 | 27 51 22.1 | 1.852 | 15 | 20 1 31.06 | 2.6584 | 25 39 32.7 | 7.412 |
| 16 | 17 56 17.51 | 2.6065 | 27 53 7.8 | 1.672 | 16 | 20 4 10.48 | 2.6555 | 25 32 2.3 | 7.600 |
| 17 | 17 58 54.05 | 2.6115 | 27 54 42.7 | 1.490 | 17 | 20 6 49.72 | 2.6524 | 25 24 20.7 | 7.786 |
| 18 | 18 1 30.89 | 2.6163 | 27 56 6.6 | 1.306 | 18 | 20 9 28.77 | 2.6492 | 25 16 28.0 | 7.972 |
| 19 | 18 4 8.01 | 2.6210 | 27 57 19.4 | 1.122 | 19 | 20 12 7.62 | 2.6458 | 25 8 24.1 | 8.157 |
| 20 | 18 6 45.41 | 2.6256 | 27 58 21.2 | 0.937 | 20 | 20 14 46.27 | 2.6424 | 25 0 9.2 | 8.341 |
| 21 | 18 9 23.08 | 2.6300 | 27 59 11.8 | 0.750 | 21 | 20 17 24.71 | 2.6388 | 24 51 43.2 | 8.524 |
| 22 | 18 12 1.01 | 2.6342 | 27 59 51.1 | 0.562 | 22 | 20 20 2.93 | 2.6351 | 24 43 6.3 | 8.706 |
| 23 | 18 14 39.18 | 2.6382 | 28 0 19.2 | 0.374 | 23 | 20 22 40.92 | 2.6312 | 24 34 18.6 | 8.884 |
| 24 | 18 17 17.59 | 2.6421 | S.28 0 36.0 | 0.185 | 24 | 20 25 18.67 | 2.6272 | S.24 25 20.2 | 9.063 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 25 18.67 | 2.6272 | S.24 25 20.2 | 9.063 |
| 1 | 20 27 56.18 | 2.6231 | 24 16 11.1 | 9.241 |
| 2 | 20 30 33.44 | 2.6189 | 24 6 51.3 | 9.418 |
| 3 | 20 33 10.45 | 2.6147 | 23 57 20.9 | 9.593 |
| 4 | 20 35 47.20 | 2.6103 | 23 47 40.1 | 9.767 |
| 5 | 20 38 23.68 | 2.6058 | 23 37 48.9 | 9.938 |
| 6 | 20 40 59.89 | 2.6012 | 23 27 47.5 | 10.109 |
| 7 | 20 43 35.82 | 2.5964 | 23 17 35.8 | 10.278 |
| 8 | 20 46 11.46 | 2.5916 | 23 7 14.1 | 10.446 |
| 9 | 20 48 46.81 | 2.5867 | 22 56 42.3 | 10.612 |
| 10 | 20 51 21.86 | 2.5817 | 22 46 0.6 | 10.777 |
| 11 | 20 53 56.61 | 2.5767 | 22 35 9.1 | 10.939 |
| 12 | 20 56 31.07 | 2.5717 | 22 24 7.9 | 11.100 |
| 13 | 20 59 5.22 | 2.5665 | 22 12 57.1 | 11.260 |
| 14 | 21 1 39.05 | 2.5612 | 22 1 36.7 | 11.418 |
| 15 | 21 4 12.56 | 2.5559 | 21 50 6.9 | 11.574 |
| 16 | 21 6 45.75 | 2.5506 | 21 38 27.8 | 11.728 |
| 17 | 21 9 18.62 | 2.5451 | 21 26 39.5 | 11.879 |
| 18 | 21 11 51.16 | 2.5396 | 21 14 42.3 | 12.029 |
| 19 | 21 14 23.37 | 2.5341 | 21 2 36.0 | 12.179 |
| 20 | 21 16 55.25 | 2.5285 | 20 50 20.8 | 12.325 |
| 21 | 21 19 26.79 | 2.5229 | 20 37 56.9 | 12.471 |
| 22 | 21 21 57.99 | 2.5172 | 20 25 24.3 | 12.614 |
| 23 | 21 24 28.85 | 2.5115 | S.20 12 43.2 | 12.756 |

### WEDNESDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 26 59.37 | 2.5057 | S.19 59 53.7 | 12.894 |
| 1 | 21 29 29.54 | 2.5000 | 19 46 55.9 | 13.032 |
| 2 | 21 31 59.37 | 2.4943 | 19 33 49.9 | 13.167 |
| 3 | 21 34 28.85 | 2.4885 | 19 20 35.9 | 13.300 |
| 4 | 21 36 57.99 | 2.4827 | 19 7 13.9 | 13.432 |
| 5 | 21 39 26.78 | 2.4768 | 18 53 44.0 | 13.562 |
| 6 | 21 41 55.21 | 2.4709 | 18 40 6.4 | 13.688 |
| 7 | 21 44 23.29 | 2.4651 | 18 26 21.4 | 13.813 |
| 8 | 21 46 51.02 | 2.4593 | 18 12 28.9 | 13.937 |
| 9 | 21 49 18.40 | 2.4535 | 17 58 29.0 | 14.058 |
| 10 | 21 51 45.43 | 2.4477 | 17 44 21.9 | 14.176 |
| 11 | 21 54 12.12 | 2.4419 | 17 30 7.9 | 14.292 |
| 12 | 21 56 38.46 | 2.4360 | 17 15 47.0 | 14.407 |
| 13 | 21 59 4.44 | 2.4301 | 17 1 19.1 | 14.520 |
| 14 | 22 1 30.07 | 2.4243 | 16 46 44.5 | 14.631 |
| 15 | 22 3 55.36 | 2.4186 | 16 32 3.4 | 14.739 |
| 16 | 22 6 20.30 | 2.4128 | 16 17 15.9 | 14.845 |
| 17 | 22 8 44.89 | 2.4070 | 16 2 22.0 | 14.949 |
| 18 | 22 11 9.14 | 2.4013 | 15 47 22.0 | 15.050 |
| 19 | 22 13 33.05 | 2.3957 | 15 32 16.0 | 15.150 |
| 20 | 22 15 56.62 | 2.3900 | 15 17 4.0 | 15.248 |
| 21 | 22 18 19.85 | 2.3843 | 15 1 46.2 | 15.344 |
| 22 | 22 20 42.74 | 2.3787 | 14 46 22.7 | 15.437 |
| 23 | 22 23 5.29 | 2.3731 | 14 30 53.8 | 15.527 |
| 24 | 22 25 27.51 | 2.3676 | S.14 15 19.5 | 15.616 |

### THURSDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 25 27.51 | 2.3676 | S.14 15 19.5 | 15.616 |
| 1 | 22 27 49.40 | 2.3622 | 13 59 39.9 | 15.703 |
| 2 | 22 30 10.97 | 2.3567 | 13 43 55.2 | 15.787 |
| 3 | 22 32 32.21 | 2.3513 | 13 28 5.5 | 15.870 |
| 4 | 22 34 53.13 | 2.3460 | 13 12 10.8 | 15.951 |
| 5 | 22 37 13.73 | 2.3407 | 12 56 11.4 | 16.028 |
| 6 | 22 39 34.01 | 2.3354 | 12 40 7.4 | 16.103 |
| 7 | 22 41 53.98 | 2.3302 | 12 23 59.0 | 16.177 |
| 8 | 22 44 13.64 | 2.3251 | 12 7 46.2 | 16.249 |
| 9 | 22 46 32.99 | 2.3200 | 11 51 29.1 | 16.318 |
| 10 | 22 48 52.04 | 2.3150 | 11 35 8.0 | 16.385 |
| 11 | 22 51 10.79 | 2.3100 | 11 18 42.9 | 16.451 |
| 12 | 22 53 29.24 | 2.3051 | 11 2 13.9 | 16.514 |
| 13 | 22 55 47.40 | 2.3003 | 10 45 41.2 | 16.575 |
| 14 | 22 58 5.27 | 2.2955 | 10 29 4.9 | 16.633 |
| 15 | 23 0 22.86 | 2.2907 | 10 12 25.2 | 16.689 |
| 16 | 23 2 40.16 | 2.2861 | 9 55 42.2 | 16.743 |
| 17 | 23 4 57.19 | 2.2816 | 9 38 56.0 | 16.796 |
| 18 | 23 7 13.95 | 2.2771 | 9 22 6.6 | 16.847 |
| 19 | 23 9 30.44 | 2.2726 | 9 5 14.3 | 16.895 |
| 20 | 23 11 46.67 | 2.2682 | 8 48 19.2 | 16.941 |
| 21 | 23 14 2.63 | 2.2639 | 8 31 21.4 | 16.984 |
| 22 | 23 16 18.34 | 2.2597 | 8 14 21.1 | 17.026 |
| 23 | 23 18 33.80 | 2.2556 | S. 7 57 18.3 | 17.067 |

### FRIDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 20 49.01 | 2.2515 | S. 7 40 13.1 | 17.104 |
| 1 | 23 23 3.98 | 2.2475 | 7 23 5.8 | 17.139 |
| 2 | 23 25 18.72 | 2.2436 | 7 5 56.4 | 17.173 |
| 3 | 23 27 33.22 | 2.2398 | 6 48 45.0 | 17.205 |
| 4 | 23 29 47.49 | 2.2360 | 6 31 31.8 | 17.234 |
| 5 | 23 32 1.54 | 2.2324 | 6 14 16.9 | 17.262 |
| 6 | 23 34 15.38 | 2.2288 | 5 57 0.4 | 17.287 |
| 7 | 23 36 29.00 | 2.2252 | 5 39 42.4 | 17.311 |
| 8 | 23 38 42.41 | 2.2218 | 5 22 23.1 | 17.332 |
| 9 | 23 40 55.62 | 2.2185 | 5 5 2.6 | 17.351 |
| 10 | 23 43 8.63 | 2.2153 | 4 47 41.0 | 17.368 |
| 11 | 23 45 21.45 | 2.2121 | 4 30 18.4 | 17.384 |
| 12 | 23 47 34.08 | 2.2089 | 4 12 54.8 | 17.398 |
| 13 | 23 49 46.52 | 2.2059 | 3 55 30.5 | 17.410 |
| 14 | 23 51 58.79 | 2.2029 | 3 38 5.6 | 17.420 |
| 15 | 23 54 10.88 | 2.2000 | 3 20 40.1 | 17.428 |
| 16 | 23 56 22.80 | 2.1973 | 3 3 14.2 | 17.434 |
| 17 | 23 58 34.56 | 2.1947 | 2 45 48.0 | 17.437 |
| 18 | 0 0 46.17 | 2.1922 | 2 28 21.7 | 17.439 |
| 19 | 0 2 57.62 | 2.1897 | 2 10 55.3 | 17.441 |
| 20 | 0 5 8.92 | 2.1872 | 1 53 28.8 | 17.440 |
| 21 | 0 7 20.08 | 2.1848 | 1 36 2.5 | 17.436 |
| 22 | 0 9 31.10 | 2.1826 | 1 18 36.5 | 17.431 |
| 23 | 0 11 41.99 | 2.1804 | 1 1 10.8 | 17.424 |
| 24 | 0 13 52.75 | 2.1783 | S. 0 43 45.6 | 17.416 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 13 52.75 | 2.1783 | S. 0 43 45.6 | 17.416 |
| 1 | 0 16 3.39 | 2.1764 | 0 26 20.9 | 17.406 |
| 2 | 0 18 13.92 | 2.1745 | S. 0 8 56.9 | 17.393 |
| 3 | 0 20 24.33 | 2.1726 | N. 0 8 26.2 | 17.378 |
| 4 | 0 22 34.63 | 2.1709 | 0 25 48.4 | 17.362 |
| 5 | 0 24 44.84 | 2.1693 | 0 43 9.6 | 17.345 |
| 6 | 0 26 54.95 | 2.1678 | 1 0 29.8 | 17.326 |
| 7 | 0 29 4.97 | 2.1663 | 1 17 48.7 | 17.305 |
| 8 | 0 31 14.91 | 2.1649 | 1 35 6.3 | 17.282 |
| 9 | 0 33 24.76 | 2.1636 | 1 52 22.5 | 17.256 |
| 10 | 0 35 34.54 | 2.1624 | 2 9 37.2 | 17.232 |
| 11 | 0 37 44.25 | 2.1612 | 2 26 50.3 | 17.204 |
| 12 | 0 39 53.89 | 2.1602 | 2 44 1.7 | 17.174 |
| 13 | 0 42 3.47 | 2.1593 | 3 1 11.2 | 17.143 |
| 14 | 0 44 13.00 | 2.1584 | 3 18 18.8 | 17.110 |
| 15 | 0 46 22.48 | 2.1576 | 3 35 24.4 | 17.076 |
| 16 | 0 48 31.91 | 2.1569 | 3 52 27.9 | 17.040 |
| 17 | 0 50 41.31 | 2.1563 | 4 9 29.2 | 17.002 |
| 18 | 0 52 50.67 | 2.1557 | 4 26 28.2 | 16.962 |
| 19 | 0 55 0.00 | 2.1553 | 4 43 24.7 | 16.921 |
| 20 | 0 57 9.31 | 2.1550 | 5 0 18.7 | 16.879 |
| 21 | 0 59 18.60 | 2.1547 | 5 17 10.2 | 16.836 |
| 22 | 1 1 27.88 | 2.1545 | 5 33 59.0 | 16.790 |
| 23 | 1 3 37.15 | 2.1543 | N. 5 50 45.0 | 16.742 |

### SUNDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 5 46.40 | 2.1542 | N. 6 7 28.1 | 16.694 |
| 1 | 1 7 55.66 | 2.1543 | 6 24 8.3 | 16.644 |
| 2 | 1 10 4.92 | 2.1545 | 6 40 45.4 | 16.593 |
| 3 | 1 12 14.19 | 2.1547 | 6 57 19.4 | 16.539 |
| 4 | 1 14 23.48 | 2.1550 | 7 13 50.1 | 16.484 |
| 5 | 1 16 32.79 | 2.1553 | 7 30 17.5 | 16.429 |
| 6 | 1 18 42.11 | 2.1557 | 7 46 41.6 | 16.372 |
| 7 | 1 20 51.47 | 2.1562 | 8 3 2.2 | 16.312 |
| 8 | 1 23 0.86 | 2.1568 | 8 19 19.1 | 16.252 |
| 9 | 1 25 10.28 | 2.1574 | 8 35 32.4 | 16.190 |
| 10 | 1 27 19.75 | 2.1582 | 8 51 41.9 | 16.127 |
| 11 | 1 29 29.27 | 2.1590 | 9 7 47.6 | 16.063 |
| 12 | 1 31 38.83 | 2.1598 | 9 23 49.4 | 15.997 |
| 13 | 1 33 48.45 | 2.1608 | 9 39 47.2 | 15.929 |
| 14 | 1 35 58.13 | 2.1618 | 9 55 40.9 | 15.860 |
| 15 | 1 38 7.87 | 2.1630 | 10 11 30.4 | 15.789 |
| 16 | 1 40 17.68 | 2.1642 | 10 27 15.6 | 15.718 |
| 17 | 1 42 27.57 | 2.1654 | 10 42 56.5 | 15.645 |
| 18 | 1 44 37.53 | 2.1667 | 10 58 33.0 | 15.571 |
| 19 | 1 46 47.57 | 2.1680 | 11 14 5.0 | 15.495 |
| 20 | 1 48 57.69 | 2.1694 | 11 29 32.4 | 15.418 |
| 21 | 1 51 7.90 | 2.1709 | 11 44 55.1 | 15.339 |
| 22 | 1 53 18.20 | 2.1725 | 12 0 13.1 | 15.259 |
| 23 | 1 55 28.60 | 2.1742 | 12 15 26.3 | 15.178 |
| 24 | 1 57 39.10 | 2.1759 | N.12 30 34.5 | 15.096 |

### MONDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 1 57 39.10 | 2.1759 | N.12 30 34.5 | 15.096 |
| 1 | 1 59 49.70 | 2.1776 | 12 45 37.8 | 15.013 |
| 2 | 2 2 0.41 | 2.1794 | 13 0 36.0 | 14.928 |
| 3 | 2 4 11.23 | 2.1812 | 13 15 29.1 | 14.842 |
| 4 | 2 6 22.16 | 2.1831 | 13 30 17.0 | 14.755 |
| 5 | 2 8 33.20 | 2.1851 | 13 44 59.7 | 14.667 |
| 6 | 2 10 44.36 | 2.1871 | 13 59 37.1 | 14.578 |
| 7 | 2 12 55.65 | 2.1892 | 14 14 9.1 | 14.487 |
| 8 | 2 15 7.07 | 2.1914 | 14 28 35.5 | 14.394 |
| 9 | 2 17 18.62 | 2.1936 | 14 42 56.3 | 14.300 |
| 10 | 2 19 30.30 | 2.1958 | 14 57 11.4 | 14.205 |
| 11 | 2 21 42.12 | 2.1981 | 15 11 20.9 | 14.110 |
| 12 | 2 23 54.07 | 2.2004 | 15 25 24.6 | 14.013 |
| 13 | 2 26 6.17 | 2.2028 | 15 39 22.4 | 13.915 |
| 14 | 2 28 18.41 | 2.2052 | 15 53 14.3 | 13.815 |
| 15 | 2 30 30.80 | 2.2077 | 16 7 0.2 | 13.714 |
| 16 | 2 32 43.34 | 2.2102 | 16 20 40.0 | 13.613 |
| 17 | 2 34 56.03 | 2.2127 | 16 34 13.7 | 13.511 |
| 18 | 2 37 8.87 | 2.2153 | 16 47 41.3 | 13.408 |
| 19 | 2 39 21.87 | 2.2180 | 17 1 2.6 | 13.302 |
| 20 | 2 41 35.03 | 2.2207 | 17 14 17.5 | 13.196 |
| 21 | 2 43 48.35 | 2.2234 | 17 27 26.0 | 13.087 |
| 22 | 2 46 1.83 | 2.2261 | 17 40 28.0 | 12.979 |
| 23 | 2 48 15.48 | 2.2288 | N.17 53 23.5 | 12.869 |

### TUESDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 2 50 29.29 | 2.2316 | N.18 6 12.3 | 12.759 |
| 1 | 2 52 43.27 | 2.2344 | 18 18 54.5 | 12.648 |
| 2 | 2 54 57.42 | 2.2373 | 18 31 30.0 | 12.535 |
| 3 | 2 57 11.75 | 2.2402 | 18 43 58.7 | 12.421 |
| 4 | 2 59 26.25 | 2.2431 | 18 56 20.5 | 12.306 |
| 5 | 3 1 40.92 | 2.2460 | 19 8 35.4 | 12.190 |
| 6 | 3 3 55.77 | 2.2489 | 19 20 43.3 | 12.073 |
| 7 | 3 6 10.79 | 2.2518 | 19 32 44.2 | 11.956 |
| 8 | 3 8 25.99 | 2.2548 | 19 44 38.0 | 11.837 |
| 9 | 3 10 41.37 | 2.2578 | 19 56 24.6 | 11.717 |
| 10 | 3 12 56.93 | 2.2609 | 20 8 4.0 | 11.596 |
| 11 | 3 15 12.68 | 2.2639 | 20 19 36.1 | 11.473 |
| 12 | 3 17 28.61 | 2.2669 | 20 31 0.8 | 11.350 |
| 13 | 3 19 44.71 | 2.2699 | 20 42 18.1 | 11.227 |
| 14 | 3 22 0.99 | 2.2729 | 20 53 28.0 | 11.103 |
| 15 | 3 24 17.45 | 2.2759 | 21 4 30.4 | 10.977 |
| 16 | 3 26 34.10 | 2.2790 | 21 15 25.2 | 10.850 |
| 17 | 3 28 50.93 | 2.2820 | 21 26 12.4 | 10.722 |
| 18 | 3 31 7.94 | 2.2850 | 21 36 51.9 | 10.594 |
| 19 | 3 33 25.13 | 2.2880 | 21 47 23.7 | 10.465 |
| 20 | 3 35 42.50 | 2.2910 | 21 57 47.7 | 10.334 |
| 21 | 3 38 0.05 | 2.2940 | 22 8 3.8 | 10.203 |
| 22 | 3 40 17.78 | 2.2970 | 22 18 12.0 | 10.071 |
| 23 | 3 42 35.69 | 2.3000 | 22 28 12.3 | 9.938 |
| 24 | 3 44 53.78 | 2.3030 | N.22 38 4.6 | 9.804 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| WEDNESDAY 13. | | | | | FRIDAY 15. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 44 53.78 | 2.3030 | N.22 38 4.6 | 9.804 | 0 | 5 38 4.37 | 2.3884 | N.27 42 3.2 | 2.683 |
| 1 | 3 47 12.05 | 2.3059 | 22 47 48.8 | 9.670 | 1 | 5 40 27.67 | 2.3883 | 27 44 39.5 | 2.527 |
| 2 | 3 49 30.49 | 2.3088 | 22 57 25.0 | 9.535 | 2 | 5 42 50.96 | 2.3881 | 27 47 6.4 | 2.370 |
| 3 | 3 51 49.10 | 2.3117 | 23 6 53.0 | 9.399 | 3 | 5 45 14.24 | 2.3878 | 27 49 23.9 | 2.214 |
| 4 | 3 54 7.89 | 2.3146 | 23 16 12.8 | 9.262 | 4 | 5 47 37.50 | 2.3874 | 27 51 32.0 | 2.058 |
| 5 | 3 56 26.85 | 2.3174 | 23 25 24.4 | 9.124 | 5 | 5 50 0.73 | 2.3869 | 27 53 30.8 | 1.902 |
| 6 | 3 58 45.98 | 2.3202 | 23 34 27.7 | 8.986 | 6 | 5 52 23.93 | 2.3863 | 27 55 20.2 | 1.745 |
| 7 | 4 1 5.28 | 2.3231 | 23 43 22.7 | 8.847 | 7 | 5 54 47.09 | 2.3857 | 27 57 0.2 | 1.589 |
| 8 | 4 3 24.75 | 2.3259 | 23 52 9.3 | 8.706 | 8 | 5 57 10.21 | 2.3849 | 27 58 30.9 | 1.434 |
| 9 | 4 5 44.38 | 2.3286 | 24 0 47.4 | 8.565 | 9 | 5 59 33.28 | 2.3840 | 27 59 52.3 | 1.279 |
| 10 | 4 8 4.18 | 2.3313 | 24 9 17.1 | 8.424 | 10 | 6 1 56.29 | 2.3830 | 28 1 4.4 | 1.124 |
| 11 | 4 10 24.14 | 2.3339 | 24 17 38.3 | 8.282 | 11 | 6 4 19.25 | 2.3820 | 28 2 7.2 | 0.969 |
| 12 | 4 12 44.25 | 2.3365 | 24 25 50.9 | 8.139 | 12 | 6 6 42.14 | 2.3810 | 28 3 0.7 | 0.814 |
| 13 | 4 15 4.52 | 2.3391 | 24 33 54.9 | 7.995 | 13 | 6 9 4.96 | 2.3798 | 28 3 44.9 | 0.659 |
| 14 | 4 17 24.94 | 2.3416 | 24 41 50.3 | 7.851 | 14 | 6 11 27.70 | 2.3783 | 28 4 19.8 | 0.504 |
| 15 | 4 19 45.51 | 2.3441 | 24 49 37.1 | 7.707 | 15 | 6 13 50.35 | 2.3767 | 28 4 45.4 | 0.350 |
| 16 | 4 22 6.23 | 2.3465 | 24 57 15.2 | 7.562 | 16 | 6 16 12.91 | 2.3751 | 28 5 1.8 | 0.196 |
| 17 | 4 24 27.09 | 2.3489 | 25 4 44.5 | 7.416 | 17 | 6 18 35.37 | 2.3735 | 28 5 9.0 | 0.042 |
| 18 | 4 26 48.09 | 2.3512 | 25 12 5.1 | 7.269 | 18 | 6 20 57.73 | 2.3717 | 28 5 6.9 | 0.112 |
| 19 | 4 29 9.23 | 2.3534 | 25 19 16.8 | 7.122 | 19 | 6 23 19.98 | 2.3699 | 28 4 55.6 | 0.265 |
| 20 | 4 31 30.50 | 2.3556 | 25 26 19.7 | 6.974 | 20 | 6 25 42.12 | 2.3680 | 28 4 35.2 | 0.417 |
| 21 | 4 33 51.91 | 2.3578 | 25 33 13.7 | 6.826 | 21 | 6 28 4.14 | 2.3659 | 28 4 5.6 | 0.569 |
| 22 | 4 36 13.45 | 2.3600 | 25 39 58.8 | 6.677 | 22 | 6 30 26.03 | 2.3637 | 28 3 26.9 | 0.720 |
| 23 | 4 38 35.11 | 2.3620 | N.25 46 35.0 | 6.528 | 23 | 6 32 47.78 | 2.3614 | N.28 2 39.2 | 0.870 |
| THURSDAY 14. | | | | | SATURDAY 16. | | | | |
| 0 | 4 40 56.89 | 2.3640 | N.25 53 2.2 | 6.378 | 0 | 6 35 9.40 | 2.3591 | N.28 1 42.5 | 1.021 |
| 1 | 4 43 18.79 | 2.3659 | 25 59 20.4 | 6.227 | 1 | 6 37 30.87 | 2.3566 | 28 0 36.7 | 1.172 |
| 2 | 4 45 40.80 | 2.3677 | 26 5 29.5 | 6.077 | 2 | 6 39 52.19 | 2.3541 | 27 59 21.9 | 1.323 |
| 3 | 4 48 2.92 | 2.3695 | 26 11 29.6 | 5.926 | 3 | 6 42 13.36 | 2.3515 | 27 57 58.0 | 1.473 |
| 4 | 4 50 25.14 | 2.3712 | 26 17 20.6 | 5.775 | 4 | 6 44 34.37 | 2.3488 | 27 56 25.1 | 1.621 |
| 5 | 4 52 47.46 | 2.3729 | 26 23 2.5 | 5.623 | 5 | 6 46 55.22 | 2.3461 | 27 54 43.4 | 1.769 |
| 6 | 4 55 9.88 | 2.3745 | 26 28 35.3 | 5.471 | 6 | 6 49 15.90 | 2.3432 | 27 52 52.8 | 1.917 |
| 7 | 4 57 32.40 | 2.3759 | 26 33 59.0 | 5.317 | 7 | 6 51 36.40 | 2.3402 | 27 50 53.3 | 2.064 |
| 8 | 4 59 55.00 | 2.3773 | 26 39 13.4 | 5.163 | 8 | 6 53 56.72 | 2.3372 | 27 48 45.1 | 2.211 |
| 9 | 5 2 17.68 | 2.3787 | 26 44 18.6 | 5.010 | 9 | 6 56 16.86 | 2.3341 | 27 46 28.0 | 2.357 |
| 10 | 5 4 40.44 | 2.3799 | 26 49 14.6 | 4.857 | 10 | 6 58 36.81 | 2.3308 | 27 44 2.2 | 2.502 |
| 11 | 5 7 3.27 | 2.3811 | 26 54 1.4 | 4.703 | 11 | 7 0 56.56 | 2.3274 | 27 41 27.7 | 2.647 |
| 12 | 5 9 26.17 | 2.3822 | 26 58 39.0 | 4.549 | 12 | 7 3 16.10 | 2.3240 | 27 38 44.5 | 2.792 |
| 13 | 5 11 49.13 | 2.3832 | 27 3 7.3 | 4.394 | 13 | 7 5 35.44 | 2.3206 | 27 35 52.7 | 2.935 |
| 14 | 5 14 12.15 | 2.3841 | 27 7 26.3 | 4.239 | 14 | 7 7 54.57 | 2.3170 | 27 32 52.3 | 3.078 |
| 15 | 5 16 35.22 | 2.3849 | 27 11 36.0 | 4.084 | 15 | 7 10 13.48 | 2.3133 | 27 29 43.4 | 3.220 |
| 16 | 5 18 58.34 | 2.3857 | 27 15 36.4 | 3.928 | 16 | 7 12 32.17 | 2.3096 | 27 26 25.9 | 3.361 |
| 17 | 5 21 21.50 | 2.3863 | 27 19 27.5 | 3.773 | 17 | 7 14 50.63 | 2.3058 | 27 23 0.0 | 3.502 |
| 18 | 5 23 44.70 | 2.3869 | 27 23 9.2 | 3.617 | 18 | 7 17 8.87 | 2.3020 | 27 19 25.7 | 3.642 |
| 19 | 5 26 7.93 | 2.3874 | 27 26 41.5 | 3.461 | 19 | 7 19 26.87 | 2.2980 | 27 15 43.0 | 3.781 |
| 20 | 5 28 31.19 | 2.3878 | 27 30 4.5 | 3.306 | 20 | 7 21 44.63 | 2.2940 | 27 11 52.0 | 3.919 |
| 21 | 5 30 54.47 | 2.3881 | 27 33 18.2 | 3.150 | 21 | 7 24 2.15 | 2.2899 | 27 7 52.7 | 4.057 |
| 22 | 5 33 17.76 | 2.3883 | 27 36 22.5 | 2.994 | 22 | 7 26 19.42 | 2.2857 | 27 3 45.1 | 4.195 |
| 23 | 5 35 41.06 | 2.3884 | 27 39 17.5 | 2.839 | 23 | 7 28 36.44 | 2.2815 | 26 59 29.3 | 4.331 |
| 24 | 5 38 4.37 | 2.3884 | N.27 42 3.2 | 2.683 | 24 | 7 30 53.21 | 2.2773 | N.26 55 5.4 | 4.466 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 17.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 30 53.21 | 2.2773 | N.26 55 5.4 | 4.466 |
| 1 | 7 33 9.72 | 2.2730 | 26 50 33.4 | 4.600 |
| 2 | 7 35 25.97 | 2.2686 | 26 45 53.4 | 4.733 |
| 3 | 7 37 41.95 | 2.2641 | 26 41 5.4 | 4.866 |
| 4 | 7 39 57.66 | 2.2596 | 26 36 9.5 | 4.998 |
| 5 | 7 42 13.10 | 2.2551 | 26 31 5.7 | 5.129 |
| 6 | 7 44 28.27 | 2.2505 | 26 25 54.0 | 5.259 |
| 7 | 7 46 43.16 | 2.2458 | 26 20 34.6 | 5.388 |
| 8 | 7 48 57.77 | 2.2410 | 26 15 7.5 | 5.516 |
| 9 | 7 51 12.09 | 2.2362 | 26 9 32.7 | 5.643 |
| 10 | 7 53 26.12 | 2.2314 | 26 3 50.3 | 5.770 |
| 11 | 7 55 39.86 | 2.2266 | 25 58 0.3 | 5.896 |
| 12 | 7 57 53.32 | 2.2218 | 25 52 2.8 | 6.020 |
| 13 | 8 0 6.48 | 2.2168 | 25 45 57.9 | 6.143 |
| 14 | 8 2 19.34 | 2.2118 | 25 39 45.6 | 6.266 |
| 15 | 8 4 31.90 | 2.2068 | 25 33 25.9 | 6.388 |
| 16 | 8 6 44.16 | 2.2018 | 25 26 59.0 | 6.508 |
| 17 | 8 8 56.12 | 2.1967 | 25 20 24.9 | 6.628 |
| 18 | 8 11 7.77 | 2.1916 | 25 13 43.6 | 6.747 |
| 19 | 8 13 19.11 | 2.1864 | 25 6 55.3 | 6.865 |
| 20 | 8 15 30.14 | 2.1813 | 24 59 59.9 | 6.982 |
| 21 | 8 17 40.87 | 2.1761 | 24 52 57.5 | 7.098 |
| 22 | 8 19 51.28 | 2.1709 | 24 45 48.1 | 7.213 |
| 23 | 8 22 1.38 | 2.1657 | N.24 38 31.9 | 7.326 |

### MONDAY 18.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 8 24 11.16 | 2.1605 | N.24 31 9.0 | 7.439 |
| 1 | 8 26 20.63 | 2.1552 | 24 23 39.3 | 7.551 |
| 2 | 8 28 29.78 | 2.1498 | 24 16 2.9 | 7.662 |
| 3 | 8 30 38.61 | 2.1445 | 24 8 19.9 | 7.772 |
| 4 | 8 32 47.12 | 2.1392 | 24 0 30.3 | 7.881 |
| 5 | 8 34 55.31 | 2.1338 | 23 52 34.2 | 7.988 |
| 6 | 8 37 3.18 | 2.1285 | 23 44 31.8 | 8.094 |
| 7 | 8 39 10.73 | 2.1232 | 23 36 23.0 | 8.199 |
| 8 | 8 41 17.97 | 2.1179 | 23 28 7.9 | 8.304 |
| 9 | 8 43 24.89 | 2.1126 | 23 19 46.5 | 8.408 |
| 10 | 8 45 31.48 | 2.1072 | 23 11 18.9 | 8.511 |
| 11 | 8 47 37.75 | 2.1018 | 23 2 45.2 | 8.612 |
| 12 | 8 49 43.70 | 2.0965 | 22 54 5.5 | 8.712 |
| 13 | 8 51 49.33 | 2.0911 | 22 45 19.8 | 8.812 |
| 14 | 8 53 54.64 | 2.0857 | 22 36 28.1 | 8.910 |
| 15 | 8 55 59.62 | 2.0803 | 22 27 30.6 | 9.007 |
| 16 | 8 58 4.28 | 2.0749 | 22 18 27.3 | 9.103 |
| 17 | 9 0 8.62 | 2.0695 | 22 9 18.2 | 9.198 |
| 18 | 9 2 12.64 | 2.0643 | 22 0 3.5 | 9.293 |
| 19 | 9 4 16.34 | 2.0590 | 21 50 43.1 | 9.386 |
| 20 | 9 6 19.72 | 2.0537 | 21 41 17.2 | 9.478 |
| 21 | 9 8 22.79 | 2.0485 | 21 31 45.8 | 9.568 |
| 22 | 9 10 25.54 | 2.0432 | 21 22 9.0 | 9.658 |
| 23 | 9 12 27.97 | 2.0379 | 21 12 26.8 | 9.747 |
| 24 | 9 14 30.09 | 2.0327 | N.21 2 39.3 | 9.836 |

### TUESDAY 19.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 14 30.09 | 2.0327 | N.21 2 39.3 | 9.836 |
| 1 | 9 16 31.90 | 2.0275 | 20 52 46.5 | 9.923 |
| 2 | 9 18 33.39 | 2.0223 | 20 42 48.5 | 10.009 |
| 3 | 9 20 34.57 | 2.0171 | 20 32 45.4 | 10.093 |
| 4 | 9 22 35.44 | 2.0119 | 20 22 37.3 | 10.177 |
| 5 | 9 24 36.00 | 2.0068 | 20 12 24.2 | 10.259 |
| 6 | 9 26 36.26 | 2.0017 | 20 2 6.2 | 10.341 |
| 7 | 9 28 36.21 | 1.9966 | 19 51 43.3 | 10.421 |
| 8 | 9 30 35.85 | 1.9916 | 19 41 15.7 | 10.500 |
| 9 | 9 32 35.19 | 1.9865 | 19 30 43.3 | 10.579 |
| 10 | 9 34 34.23 | 1.9815 | 19 20 6.2 | 10.657 |
| 11 | 9 36 32.97 | 1.9766 | 19 9 24.4 | 10.735 |
| 12 | 9 38 31.42 | 1.9717 | 18 58 38.0 | 10.811 |
| 13 | 9 40 29.57 | 1.9668 | 18 47 47.1 | 10.886 |
| 14 | 9 42 27.43 | 1.9619 | 18 36 51.8 | 10.959 |
| 15 | 9 44 25.00 | 1.9571 | 18 25 52.1 | 11.031 |
| 16 | 9 46 22.28 | 1.9523 | 18 14 48.1 | 11.102 |
| 17 | 9 48 19.27 | 1.9475 | 18 3 39.8 | 11.172 |
| 18 | 9 50 15.98 | 1.9428 | 17 52 27.4 | 11.242 |
| 19 | 9 52 12.41 | 1.9382 | 17 41 10.8 | 11.311 |
| 20 | 9 54 8.56 | 1.9335 | 17 29 50.1 | 11.378 |
| 21 | 9 56 4.43 | 1.9288 | 17 18 25.4 | 11.445 |
| 22 | 9 58 0.02 | 1.9243 | 17 6 56.7 | 11.511 |
| 23 | 9 59 55.34 | 1.9198 | N.16 55 24.1 | 11.576 |

### WEDNESDAY 20.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 10 1 50.40 | 1.9153 | N.16 43 47.6 | 11.640 |
| 1 | 10 3 45.19 | 1.9109 | 16 32 7.3 | 11.702 |
| 2 | 10 5 39.71 | 1.9065 | 16 20 23.3 | 11.764 |
| 3 | 10 7 33.97 | 1.9021 | 16 8 35.6 | 11.825 |
| 4 | 10 9 27.97 | 1.8979 | 15 56 44.3 | 11.885 |
| 5 | 10 11 21.72 | 1.8937 | 15 44 49.4 | 11.943 |
| 6 | 10 13 15.21 | 1.8895 | 15 32 51.1 | 12.001 |
| 7 | 10 15 8.45 | 1.8853 | 15 20 49.3 | 12.058 |
| 8 | 10 17 1.45 | 1.8812 | 15 8 44.1 | 12.115 |
| 9 | 10 18 54.20 | 1.8772 | 14 56 35.5 | 12.171 |
| 10 | 10 20 46.71 | 1.8732 | 14 44 23.6 | 12.226 |
| 11 | 10 22 38.98 | 1.8692 | 14 32 8.5 | 12.278 |
| 12 | 10 24 31.01 | 1.8653 | 14 19 50.2 | 12.331 |
| 13 | 10 26 22.81 | 1.8614 | 14 7 28.8 | 12.382 |
| 14 | 10 28 14.38 | 1.8576 | 13 55 4.3 | 12.433 |
| 15 | 10 30 5.73 | 1.8539 | 13 42 36.8 | 12.482 |
| 16 | 10 31 56.85 | 1.8502 | 13 30 6.4 | 12.531 |
| 17 | 10 33 47.75 | 1.8466 | 13 17 33.1 | 12.579 |
| 18 | 10 35 38.44 | 1.8430 | 13 4 56.9 | 12.627 |
| 19 | 10 37 28.91 | 1.8394 | 12 52 17.9 | 12.673 |
| 20 | 10 39 19.17 | 1.8360 | 12 39 36.2 | 12.717 |
| 21 | 10 41 9.23 | 1.8326 | 12 26 51.8 | 12.761 |
| 22 | 10 42 59.08 | 1.8292 | 12 14 4.8 | 12.806 |
| 23 | 10 44 48.73 | 1.8259 | 12 1 15.2 | 12.848 |
| 24 | 10 46 38.19 | 1.8227 | N.11 48 23.0 | 12.891 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### THURSDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 46 38.19 | 1.8227 | N.11 48 23.0 | 12.891 |
| 1 | 10 48 27.45 | 1.8195 | 11 35 28.3 | 12.932 |
| 2 | 10 50 16.52 | 1.8163 | 11 22 31.2 | 12.972 |
| 3 | 10 52 5.41 | 1.8132 | 11 9 31.7 | 13.011 |
| 4 | 10 53 54.11 | 1.8102 | 10 56 29.9 | 13.049 |
| 5 | 10 55 42.63 | 1.8072 | 10 43 25.9 | 13.085 |
| 6 | 10 57 30.98 | 1.8044 | 10 30 19.7 | 13.122 |
| 7 | 10 59 19.16 | 1.8016 | 10 17 11.3 | 13.158 |
| 8 | 11 1 7.17 | 1.7988 | 10 4 0.7 | 13.194 |
| 9 | 11 2 55.01 | 1.7960 | 9 50 48.0 | 13.228 |
| 10 | 11 4 42.68 | 1.7932 | 9 37 33.3 | 13.262 |
| 11 | 11 6 30.20 | 1.7906 | 9 24 16.6 | 13.295 |
| 12 | 11 8 17.56 | 1.7881 | 9 10 57.9 | 13.327 |
| 13 | 11 10 4.77 | 1.7857 | 8 57 37.3 | 13.358 |
| 14 | 11 11 51.84 | 1.7833 | 8 44 14.9 | 13.387 |
| 15 | 11 13 38.77 | 1.7810 | 8 30 50.8 | 13.416 |
| 16 | 11 15 25.56 | 1.7787 | 8 17 25.0 | 13.444 |
| 17 | 11 17 12.21 | 1.7764 | 8 3 57.5 | 13.472 |
| 18 | 11 18 58.73 | 1.7742 | 7 50 28.3 | 13.500 |
| 19 | 11 20 45.12 | 1.7721 | 7 36 57.5 | 13.526 |
| 20 | 11 22 31.39 | 1.7700 | 7 23 25.2 | 13.551 |
| 21 | 11 24 17.53 | 1.7680 | 7 9 51.4 | 13.576 |
| 22 | 11 26 3.55 | 1.7661 | 6 56 16.1 | 13.600 |
| 23 | 11 27 49.46 | 1.7643 | N. 6 42 39.4 | 13.623 |

#### FRIDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 29 35.27 | 1.7626 | N. 6 29 1.3 | 13.646 |
| 1 | 11 31 20.97 | 1.7608 | 6 15 21.9 | 13.667 |
| 2 | 11 33 6.57 | 1.7591 | 6 1 41.2 | 13.688 |
| 3 | 11 34 52.06 | 1.7574 | 5 47 59.3 | 13.707 |
| 4 | 11 36 37.46 | 1.7559 | 5 34 16.3 | 13.726 |
| 5 | 11 38 22.77 | 1.7545 | 5 20 32.2 | 13.745 |
| 6 | 11 40 8.00 | 1.7532 | 5 6 46.9 | 13.763 |
| 7 | 11 41 53.15 | 1.7518 | 4 53 0.6 | 13.780 |
| 8 | 11 43 38.22 | 1.7505 | 4 39 13.3 | 13.796 |
| 9 | 11 45 23.21 | 1.7492 | 4 25 25.1 | 13.811 |
| 10 | 11 47 8.13 | 1.7481 | 4 11 36.0 | 13.826 |
| 11 | 11 48 52.98 | 1.7470 | 3 57 46.0 | 13.841 |
| 12 | 11 50 37.77 | 1.7461 | 3 43 55.1 | 13.854 |
| 13 | 11 52 22.51 | 1.7452 | 3 30 3.5 | 13.866 |
| 14 | 11 54 7.19 | 1.7442 | 3 16 11.2 | 13.877 |
| 15 | 11 55 51.81 | 1.7433 | 3 2 18.2 | 13.888 |
| 16 | 11 57 36.38 | 1.7425 | 2 48 24.6 | 13.898 |
| 17 | 11 59 20.91 | 1.7419 | 2 34 30.4 | 13.908 |
| 18 | 12 1 5.41 | 1.7413 | 2 20 35.6 | 13.917 |
| 19 | 12 2 49.87 | 1.7407 | 2 6 40.3 | 13.925 |
| 20 | 12 4 34.30 | 1.7402 | 1 52 44.6 | 13.932 |
| 21 | 12 6 18.70 | 1.7398 | 1 38 48.4 | 13.939 |
| 22 | 12 8 3.08 | 1.7395 | 1 24 51.9 | 13.945 |
| 23 | 12 9 47.44 | 1.7392 | 1 10 55.0 | 13.951 |
| 24 | 12 11 31.79 | 1.7390 | N. 0 56 57.8 | 13.955 |

#### SATURDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 11 31.79 | 1.7390 | N. 0 56 57.8 | 13.955 |
| 1 | 12 13 16.12 | 1.7389 | 0 43 0.4 | 13.959 |
| 2 | 12 15 0.45 | 1.7388 | 0 29 2.8 | 13.962 |
| 3 | 12 16 44.78 | 1.7388 | 0 15 5.0 | 13.964 |
| 4 | 12 18 29.11 | 1.7389 | N. 0 1 7.1 | 13.966 |
| 5 | 12 20 13.45 | 1.7390 | S. 0 12 50.9 | 13.967 |
| 6 | 12 21 57.79 | 1.7392 | 0 26 48.9 | 13.967 |
| 7 | 12 23 42.15 | 1.7395 | 0 40 46.9 | 13.967 |
| 8 | 12 25 26.53 | 1.7398 | 0 54 44.9 | 13.965 |
| 9 | 12 27 10.93 | 1.7402 | 1 8 42.7 | 13.963 |
| 10 | 12 28 55.35 | 1.7406 | 1 22 40.4 | 13.960 |
| 11 | 12 30 39.80 | 1.7412 | 1 36 37.9 | 13.957 |
| 12 | 12 32 24.29 | 1.7418 | 1 50 35.2 | 13.953 |
| 13 | 12 34 8.82 | 1.7425 | 2 4 32.3 | 13.948 |
| 14 | 12 35 53.39 | 1.7432 | 2 18 29.0 | 13.942 |
| 15 | 12 37 38.00 | 1.7439 | 2 32 25.3 | 13.935 |
| 16 | 12 39 22.66 | 1.7448 | 2 46 21.2 | 13.928 |
| 17 | 12 41 7.38 | 1.7458 | 3 0 16.7 | 13.921 |
| 18 | 12 42 52.16 | 1.7469 | 3 14 11.7 | 13.912 |
| 19 | 12 44 37.01 | 1.7481 | 3 28 6.1 | 13.903 |
| 20 | 12 46 21.93 | 1.7493 | 3 42 0.0 | 13.893 |
| 21 | 12 48 6.92 | 1.7505 | 3 55 53.3 | 13.882 |
| 22 | 12 49 51.98 | 1.7517 | 4 9 45.9 | 13.871 |
| 23 | 12 51 37.12 | 1.7531 | S. 4 23 37.8 | 13.859 |

#### SUNDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 12 53 22.35 | 1.7546 | S. 4 37 29.0 | 13.847 |
| 1 | 12 55 7.67 | 1.7561 | 4 51 19.4 | 13.833 |
| 2 | 12 56 53.08 | 1.7576 | 5 5 8.9 | 13.818 |
| 3 | 12 58 38.58 | 1.7592 | 5 18 57.6 | 13.803 |
| 4 | 13 0 24.19 | 1.7610 | 5 32 45.3 | 13.788 |
| 5 | 13 2 9.91 | 1.7629 | 5 46 32.1 | 13.772 |
| 6 | 13 3 55.74 | 1.7648 | 6 0 17.9 | 13.754 |
| 7 | 13 5 41.68 | 1.7667 | 6 14 2.6 | 13.736 |
| 8 | 13 7 27.74 | 1.7687 | 6 27 46.2 | 13.717 |
| 9 | 13 9 13.92 | 1.7707 | 6 41 28.7 | 13.697 |
| 10 | 13 11 0.22 | 1.7728 | 6 55 10.0 | 13.677 |
| 11 | 13 12 46.65 | 1.7750 | 7 8 50.0 | 13.657 |
| 12 | 13 14 33.22 | 1.7773 | 7 22 28.8 | 13.636 |
| 13 | 13 16 19.93 | 1.7797 | 7 46 6.3 | 13.613 |
| 14 | 13 18 6.79 | 1.7822 | 7 59 42.3 | 13.589 |
| 15 | 13 19 53.80 | 1.7847 | 8 3 16.9 | 13.565 |
| 16 | 13 21 40.96 | 1.7872 | 8 16 50.1 | 13.541 |
| 17 | 13 23 28.27 | 1.7898 | 8 30 21.8 | 13.515 |
| 18 | 13 25 15.74 | 1.7926 | 8 43 51.9 | 13.488 |
| 19 | 13 27 3.38 | 1.7954 | 8 57 20.4 | 13.461 |
| 20 | 13 28 51.19 | 1.7983 | 9 10 47.2 | 13.433 |
| 21 | 13 30 39.18 | 1.8012 | 9 24 12.3 | 13.404 |
| 22 | 13 32 27.34 | 1.8043 | 9 37 35.7 | 13.375 |
| 23 | 13 34 15.69 | 1.8074 | 9 50 57.3 | 13.345 |
| 24 | 13 36 4.23 | 1.8106 | S.10 4 17.1 | 13.314 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### MONDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 36 4.23 | 1.8106 | S.10 4 17.1 | 13.314 |
| 1 | 13 37 52.96 | 1.8138 | 10 17 35.0 | 13.282 |
| 2 | 13 39 41.88 | 1.8170 | 10 30 50.9 | 13.249 |
| 3 | 13 41 31.00 | 1.8204 | 10 44 4.8 | 13.215 |
| 4 | 13 43 20.33 | 1.8239 | 10 57 16.7 | 13.181 |
| 5 | 13 45 9.87 | 1.8274 | 11 0 26.5 | 13.146 |
| 6 | 13 46 59.62 | 1.8309 | 11 23 34.2 | 13.110 |
| 7 | 13 48 49.58 | 1.8345 | 11 36 39.7 | 13.073 |
| 8 | 13 50 39.76 | 1.8382 | 11 49 42.9 | 13.035 |
| 9 | 13 52 30.17 | 1.8421 | 12 2 43.9 | 12.996 |
| 10 | 13 54 20.81 | 1.8460 | 12 15 42.5 | 12.957 |
| 11 | 13 56 11.69 | 1.8499 | 12 28 38.7 | 12.917 |
| 12 | 13 58 2.80 | 1.8538 | 12 41 32.5 | 12.876 |
| 13 | 13 59 54.15 | 1.8579 | 12 54 23.8 | 12.833 |
| 14 | 14 1 45.75 | 1.8621 | 13 7 12.5 | 12.790 |
| 15 | 14 3 37.60 | 1.8663 | 13 19 58.6 | 12.747 |
| 16 | 14 5 29.71 | 1.8707 | 13 32 42.1 | 12.703 |
| 17 | 14 7 22.08 | 1.8751 | 13 45 22.9 | 12.657 |
| 18 | 14 9 14.72 | 1.8796 | 13 58 0.9 | 12.610 |
| 19 | 14 11 7.63 | 1.8841 | 14 10 36.1 | 12.562 |
| 20 | 14 13 0.81 | 1.8886 | 14 23 8.4 | 12.514 |
| 21 | 14 14 54.26 | 1.8932 | 14 35 37.8 | 12.465 |
| 22 | 14 16 47.99 | 1.8979 | 14 48 4.2 | 12.415 |
| 23 | 14 18 42.01 | 1.9026 | S.15 0 27.6 | 12.364 |

### TUESDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 20 36.31 | 1.9074 | S.15 12 47.9 | 12.312 |
| 1 | 14 22 30.90 | 1.9123 | 15 25 5.0 | 12.258 |
| 2 | 14 24 25.79 | 1.9174 | 15 37 18.9 | 12.204 |
| 3 | 14 26 20.99 | 1.9225 | 15 49 29.5 | 12.149 |
| 4 | 14 28 16.49 | 1.9276 | 16 1 36.8 | 12.093 |
| 5 | 14 30 12.30 | 1.9327 | 16 13 40.7 | 12.036 |
| 6 | 14 32 8.42 | 1.9380 | 16 25 41.2 | 11.978 |
| 7 | 14 34 4.86 | 1.9433 | 16 37 38.1 | 11.919 |
| 8 | 14 36 1.62 | 1.9487 | 16 49 31.5 | 11.859 |
| 9 | 14 37 58.70 | 1.9541 | 17 1 21.3 | 11.799 |
| 10 | 14 39 56.11 | 1.9596 | 17 13 7.4 | 11.737 |
| 11 | 14 41 53.85 | 1.9651 | 17 24 49.7 | 11.673 |
| 12 | 14 43 51.92 | 1.9707 | 17 36 28.1 | 11.608 |
| 13 | 14 45 50.33 | 1.9763 | 17 48 2.6 | 11.542 |
| 14 | 14 47 49.08 | 1.9821 | 17 59 33.2 | 11.476 |
| 15 | 14 49 48.18 | 1.9879 | 18 10 59.8 | 11.409 |
| 16 | 14 51 47.63 | 1.9938 | 18 22 22.3 | 11.341 |
| 17 | 14 53 47.44 | 1.9998 | 18 33 40.7 | 11.272 |
| 18 | 14 55 47.61 | 2.0058 | 18 44 55.0 | 11.202 |
| 19 | 14 57 48.14 | 2.0118 | 18 56 5.0 | 11.130 |
| 20 | 14 59 49.03 | 2.0179 | 19 7 10.6 | 11.057 |
| 21 | 15 1 50.29 | 2.0241 | 19 18 11.8 | 10.982 |
| 22 | 15 3 51.92 | 2.0303 | 19 29 8.5 | 10.907 |
| 23 | 15 5 53.92 | 2.0365 | 19 40 0.7 | 10.831 |
| 24 | 15 7 56.30 | 2.0428 | S.19 50 48.3 | 10.754 |

### WEDNESDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 7 56.30 | 2.0428 | S.19 50 48.3 | 10.754 |
| 1 | 15 9 59.06 | 2.0492 | 20 1 31.2 | 10.675 |
| 2 | 15 12 2.21 | 2.0557 | 20 12 9.3 | 10.595 |
| 3 | 15 14 5.74 | 2.0622 | 20 22 42.6 | 10.514 |
| 4 | 15 16 9.66 | 2.0687 | 20 33 11.0 | 10.432 |
| 5 | 15 18 13.98 | 2.0752 | 20 43 34.5 | 10.349 |
| 6 | 15 20 18.69 | 2.0818 | 20 53 52.9 | 10.264 |
| 7 | 15 22 23.80 | 2.0885 | 21 4 6.2 | 10.178 |
| 8 | 15 24 29.31 | 2.0952 | 21 14 14.3 | 10.092 |
| 9 | 15 26 35.22 | 2.1019 | 21 24 17.2 | 10.004 |
| 10 | 15 28 41.53 | 2.1086 | 21 34 14.8 | 9.914 |
| 11 | 15 30 48.25 | 2.1154 | 21 44 7.0 | 9.823 |
| 12 | 15 32 55.38 | 2.1223 | 21 53 53.6 | 9.731 |
| 13 | 15 35 2.92 | 2.1292 | 22 3 34.7 | 9.638 |
| 14 | 15 37 10.88 | 2.1362 | 22 13 10.2 | 9.543 |
| 15 | 15 39 19.26 | 2.1432 | 22 22 40.0 | 9.448 |
| 16 | 15 41 28.06 | 2.1502 | 22 32 4.0 | 9.351 |
| 17 | 15 43 37.28 | 2.1572 | 22 41 22.2 | 9.253 |
| 18 | 15 45 46.92 | 2.1642 | 22 50 34.4 | 9.156 |
| 19 | 15 47 56.98 | 2.1712 | 22 59 40.6 | 9.062 |
| 20 | 15 50 7.47 | 2.1783 | 23 8 40.7 | 8.960 |
| 21 | 15 52 18.38 | 2.1854 | 23 17 34.6 | 8.847 |
| 22 | 15 54 29.72 | 2.1926 | 23 26 22.3 | 8.742 |
| 23 | 15 56 41.49 | 2.1997 | S.23 35 3.6 | 8.635 |

### THURSDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 58 53.69 | 2.2069 | S.23 43 38.5 | 8.527 |
| 1 | 16 1 6.32 | 2.2141 | 23 52 6.9 | 8.418 |
| 2 | 16 3 19.38 | 2.2213 | 24 0 28.7 | 8.308 |
| 3 | 16 5 32.88 | 2.2286 | 24 8 43.9 | 8.197 |
| 4 | 16 7 46.81 | 2.2358 | 24 16 52.3 | 8.084 |
| 5 | 16 10 1.17 | 2.2430 | 24 24 54.0 | 7.969 |
| 6 | 16 12 15.96 | 2.2502 | 24 32 48.7 | 7.853 |
| 7 | 16 14 31.19 | 2.2574 | 24 40 36.4 | 7.737 |
| 8 | 16 16 46.85 | 2.2647 | 24 48 17.1 | 7.619 |
| 9 | 16 19 2.95 | 2.2719 | 24 55 50.7 | 7.499 |
| 10 | 16 21 19.48 | 2.2792 | 25 3 17.0 | 7.378 |
| 11 | 16 23 36.45 | 2.2864 | 25 10 36.0 | 7.256 |
| 12 | 16 25 53.85 | 2.2936 | 25 17 47.7 | 7.132 |
| 13 | 16 28 11.68 | 2.3008 | 25 24 51.9 | 7.007 |
| 14 | 16 30 29.94 | 2.3080 | 25 31 48.5 | 6.880 |
| 15 | 16 32 48.64 | 2.3152 | 25 38 37.5 | 6.752 |
| 16 | 16 35 7.76 | 2.3223 | 25 45 18.7 | 6.622 |
| 17 | 16 37 27.31 | 2.3294 | 25 51 52.1 | 6.491 |
| 18 | 16 39 47.29 | 2.3365 | 25 58 17.6 | 6.358 |
| 19 | 16 42 7.70 | 2.3436 | 26 4 35.1 | 6.225 |
| 20 | 16 44 28.53 | 2.3506 | 26 10 44.6 | 6.090 |
| 21 | 16 46 49.77 | 2.3575 | 26 16 46.0 | 5.954 |
| 22 | 16 49 11.43 | 2.3645 | 26 22 39.1 | 5.816 |
| 23 | 16 51 33.51 | 2.3715 | 26 28 23.9 | 5.677 |
| 24 | 16 53 56.01 | 2.3784 | S.26 34 0.3 | 5.537 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 53 56.01 | 2.3784 | S.26 34 0.3 | 5.537 |
| 1 | 16 56 18.92 | 2.3853 | 26 39 28.3 | 5.396 |
| 2 | 16 58 42.24 | 2.3920 | 26 44 47.8 | 5.253 |
| 3 | 17 1 5.96 | 2.3987 | 26 49 58.6 | 5.108 |
| 4 | 17 3 30.08 | 2.4054 | 26 55 0.7 | 4.962 |
| 5 | 17 5 54.60 | 2.4120 | 26 59 54.0 | 4.814 |
| 6 | 17 8 19.52 | 2.4186 | 27 4 38.4 | 4.666 |
| 7 | 17 10 44.84 | 2.4252 | 27 9 13.9 | 4.517 |
| 8 | 17 13 10.54 | 2.4316 | 27 13 40.4 | 4.366 |
| 9 | 17 15 36.63 | 2.4379 | 27 17 57.8 | 4.213 |
| 10 | 17 18 3.09 | 2.4442 | 27 22 6.0 | 4.059 |
| 11 | 17 20 29.93 | 2.4504 | 27 26 4.9 | 3.904 |
| 12 | 17 22 57.14 | 2.4566 | 27 29 54.5 | 3.748 |
| 13 | 17 25 24.72 | 2.4627 | 27 33 34.7 | 3.591 |
| 14 | 17 27 52.66 | 2.4687 | 27 37 5.4 | 3.432 |
| 15 | 17 30 20.96 | 2.4746 | 27 40 26.6 | 3.272 |
| 16 | 17 32 49.61 | 2.4803 | 27 43 38.1 | 3.111 |
| 17 | 17 35 18.60 | 2.4860 | 27 46 39.9 | 2.949 |
| 18 | 17 37 47.93 | 2.4917 | 27 49 32.0 | 2.786 |
| 19 | 17 40 17.60 | 2.4973 | 27 52 14.3 | 2.622 |
| 20 | 17 42 47.60 | 2.5027 | 27 54 46.7 | 2.456 |
| 21 | 17 45 17.92 | 2.5080 | 27 57 9.1 | 2.289 |
| 22 | 17 47 48.56 | 2.5132 | 27 59 21.4 | 2.120 |
| 23 | 17 50 19.51 | 2.5183 | 28 1 23.5 | 1.950 |
| 24 | 17 52 50.75 | 2.5232 | S.28 3 15.4 | 1.779 |

### SATURDAY, MARCH 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 52 50.75 | 2.5232 | S.28 3 15.4 | 1.779 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ● New Moon, . . | 5 | 22 | 36.1 |
| ☽ First Quarter, . | 12 | 14 | 11.7 |
| ○ Full Moon, . . | 20 | 9 | 40.4 |
| ☾ Last Quarter, . . | 28 | 13 | 41.5 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . . | 7 | 2.6 |
| ☾ Apogee, . . . . . | 22 | 7.0 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Regulus | W. | 98 55 38 | 2641 | 100 33 37 | 2623 | 102 12 1 | 2605 | 103 50 49 | 2586 |
| | Mars | W. | 48 15 32 | 2712 | 49 51 56 | 2693 | 51 28 45 | 2675 | 53 5 59 | 2655 |
| | Spica | W. | 44 52 45 | 2639 | 46 30 46 | 2621 | 48 9 13 | 2602 | 49 48 5 | 2583 |
| | Sun | E. | 65 10 16 | 3001 | 63 40 5 | 2982 | 62 9 30 | 2962 | 60 38 30 | 2943 |
| 2 | Mars | W. | 61 18 49 | 2557 | 62 58 43 | 2537 | 64 39 5 | 2518 | 66 19 53 | 2498 |
| | Spica | W. | 58 9 2 | 2487 | 59 50 33 | 2468 | 61 32 31 | 2450 | 63 14 55 | 2431 |
| | Antares | W. | 12 16 19 | 2504 | 13 57 27 | 2480 | 15 39 8 | 2457 | 17 21 22 | 2436 |
| | Sun | E. | 52 57 20 | 2845 | 51 23 51 | 2826 | 49 49 57 | 2807 | 48 15 38 | 2788 |
| 3 | Mars | W. | 74 50 43 | 2403 | 76 34 14 | 2384 | 78 18 12 | 2366 | 80 2 35 | 2348 |
| | Spica | W. | 71 53 39 | 2338 | 73 38 43 | 2320 | 75 24 14 | 2302 | 77 10 11 | 2285 |
| | Antares | W. | 25 59 40 | 2338 | 27 44 44 | 2320 | 29 30 14 | 2302 | 31 16 11 | 2284 |
| | Sun | E. | 40 17 55 | 2696 | 38 41 14 | 2681 | 37 4 8 | 2666 | 35 26 42 | 2650 |
| 8 | Sun | W. | 29 10 12 | 2398 | 30 53 50 | 2399 | 32 37 26 | 2402 | 34 20 58 | 2405 |
| | α Arietis | E. | 49 14 53 | 2135 | 47 24 47 | 2147 | 45 35 0 | 2162 | 43 45 35 | 2178 |
| | Aldebaran | E. | 79 32 48 | 2086 | 77 41 30 | 2094 | 75 50 22 | 2102 | 73 59 26 | 2111 |
| | Saturn | E. | 95 14 25 | 2044 | 93 22 0 | 2051 | 91 29 45 | 2059 | 89 37 42 | 2066 |
| 9 | Sun | W. | 42 56 44 | 2441 | 44 39 20 | 2451 | 46 21 42 | 2462 | 48 3 49 | 2473 |
| | Jupiter | W. | 23 33 7 | 2200 | 25 21 34 | 2208 | 27 9 49 | 2217 | 28 57 51 | 2227 |
| | α Arietis | E. | 34 45 15 | 2286 | 32 58 55 | 2316 | 31 13 19 | 2350 | 29 28 32 | 2389 |
| | Aldebaran | E. | 64 48 30 | 2166 | 62 59 11 | 2178 | 61 10 11 | 2192 | 59 21 32 | 2207 |
| | Saturn | E. | 80 20 41 | 2114 | 78 30 3 | 2124 | 76 39 41 | 2136 | 74 49 37 | 2149 |
| | Pollux | E. | 108 26 59 | 2108 | 106 36 5 | 2115 | 104 45 29 | 2126 | 102 55 10 | 2137 |
| 10 | Sun | W. | 56 30 13 | 2537 | 58 10 35 | 2551 | 59 50 38 | 2565 | 61 30 21 | 2580 |
| | Jupiter | W. | 37 54 9 | 2284 | 39 40 32 | 2298 | 41 26 35 | 2311 | 43 12 18 | 2325 |
| | Aldebaran | E. | 50 24 2 | 2290 | 48 37 48 | 2309 | 46 52 1 | 2328 | 45 6 43 | 2350 |
| | Saturn | E. | 65 44 8 | 2216 | 63 56 4 | 2231 | 62 8 22 | 2245 | 60 21 1 | 2260 |
| | Pollux | E. | 93 48 11 | 2202 | 91 59 44 | 2216 | 90 11 42 | 2230 | 88 23 59 | 2245 |
| 11 | Sun | W. | 69 43 46 | 2657 | 71 21 23 | 2673 | 72 58 39 | 2689 | 74 35 34 | 2705 |
| | Jupiter | W. | 51 55 46 | 2398 | 53 39 24 | 2413 | 55 22 40 | 2428 | 57 5 35 | 2443 |
| | α Pegasi | W. | 43 45 26 | 3068 | 45 14 15 | 3040 | 46 43 38 | 3015 | 48 13 32 | 2995 |
| | Aldebaran | E. | 36 28 18 | 2472 | 34 46 25 | 2501 | 33 5 13 | 2533 | 31 24 46 | 2569 |
| | Saturn | E. | 51 30 5 | 2341 | 49 45 5 | 2357 | 48 0 29 | 2375 | 46 16 18 | 2392 |
| | Pollux | E. | 79 30 47 | 2319 | 77 45 14 | 2334 | 76 0 4 | 2349 | 74 15 16 | 2364 |
| | Regulus | E. | 116 5 17 | 2328 | 114 19 59 | 2344 | 112 35 3 | 2359 | 110 50 29 | 2373 |
| 12 | Sun | W. | 82 34 43 | 2786 | 84 9 29 | 2803 | 85 43 53 | 2819 | 87 17 56 | 2835 |
| | Jupiter | W. | 65 34 43 | 2520 | 67 15 28 | 2535 | 68 55 52 | 2551 | 70 35 55 | 2566 |
| | α Pegasi | W. | 55 47 58 | 2941 | 57 19 25 | 2938 | 58 50 56 | 2936 | 60 22 30 | 2935 |
| | Saturn | E. | 37 41 47 | 2485 | 36 0 12 | 2504 | 34 19 4 | 2524 | 32 38 24 | 2545 |
| | Pollux | E. | 65 36 44 | 2441 | 63 54 6 | 2456 | 62 11 51 | 2471 | 60 29 57 | 2486 |
| | Regulus | E. | 102 13 2 | 2449 | 100 30 37 | 2464 | 98 48 33 | 2480 | 97 6 51 | 2494 |
| 13 | Sun | W. | 95 3 3 | 2913 | 96 35 5 | 2929 | 98 6 47 | 2944 | 99 38 10 | 2959 |
| | α Pegasi | W. | 68 0 0 | 2950 | 69 31 16 | 2956 | 71 2 25 | 2962 | 72 33 25 | 2969 |
| | α Arietis | W. | 24 22 39 | 2883 | 25 55 20 | 2861 | 27 28 29 | 2844 | 29 2 0 | 2832 |
| | Pollux | E. | 52 5 41 | 2559 | 50 25 50 | 2574 | 48 46 19 | 2588 | 47 7 7 | 2602 |
| | Regulus | E. | 88 43 27 | 2566 | 87 3 46 | 2581 | 85 24 25 | 2595 | 83 45 23 | 2609 |
| 14 | Sun | W. | 107 10 30 | 3031 | 108 40 4 | 3044 | 110 9 22 | 3058 | 111 38 23 | 3071 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Regulus | W. | 105 30 3 | 2568 | 107 9 42 | 2549 | 108 49 47 | 2530 | 110 30 18 | 2512 |
| | Mars | W. | 54 43 40 | 2635 | 56 21 47 | 2615 | 58 0 21 | 2596 | 59 39 22 | 2577 |
| | Spica | W. | 51 27 24 | 2564 | 53 7 9 | 2546 | 54 47 20 | 2525 | 56 27 58 | 2507 |
| | Sun | E. | 59 7 6 | 2924 | 57 35 17 | 2904 | 56 3 3 | 2884 | 54 30 24 | 2865 |
| 2 | Mars | W. | 68 1 9 | 2479 | 69 42 52 | 2460 | 71 25 2 | 2441 | 73 7 39 | 2422 |
| | Spica | W. | 64 57 46 | 2412 | 66 41 4 | 2393 | 68 24 49 | 2374 | 70 9 1 | 2356 |
| | Antares | W. | 19 4 5 | 2417 | 20 47 16 | 2396 | 22 30 56 | 2377 | 24 15 4 | 2357 |
| | Sun | E. | 46 40 54 | 2769 | 45 5 45 | 2750 | 43 30 11 | 2731 | 41 54 12 | 2716 |
| 3 | Mars | W. | 81 47 25 | 2330 | 83 32 41 | 2313 | 85 18 21 | 2296 | 87 4 26 | 2280 |
| | Spica | W. | 78 56 33 | 2268 | 80 43 20 | 2251 | 82 30 32 | 2235 | 84 18 8 | 2218 |
| | Antares | W. | 33 2 34 | 2276 | 34 49 22 | 2249 | 36 36 36 | 2233 | 38 25 14 | 2218 |
| | Sun | E. | 33 48 54 | 2635 | 32 10 46 | 2621 | 30 32 23 | 2610 | 28 53 44 | 2599 |
| 8 | Sun | W. | 36 4 25 | 2410 | 37 47 45 | 2417 | 39 30 55 | 2424 | 41 13 55 | 2432 |
| | α Arietis | E. | 41 56 34 | 2194 | 40 7 58 | 2213 | 38 19 50 | 2235 | 36 32 15 | 2259 |
| | Aldebaran | E. | 72 8 44 | 2120 | 70 18 16 | 2131 | 68 28 4 | 2141 | 66 38 8 | 2153 |
| | Saturn | E. | 87 45 50 | 2074 | 85 54 11 | 2084 | 84 2 47 | 2092 | 82 11 36 | 2103 |
| 9 | Sun | W. | 49 45 40 | 2485 | 51 27 15 | 2497 | 53 8 32 | 2510 | 54 49 32 | 2523 |
| | Jupiter | W. | 30 45 39 | 2237 | 32 33 12 | 2247 | 34 20 29 | 2260 | 36 7 28 | 2272 |
| | α Arietis | E. | 27 44 42 | 2436 | 26 1 58 | 2489 | 24 20 29 | 2549 | 22 40 24 | 2619 |
| | Aldebaran | E. | 57 33 15 | 2223 | 55 45 21 | 2238 | 53 57 50 | 2255 | 52 10 44 | 2272 |
| | Saturn | E. | 72 59 52 | 2162 | 71 10 26 | 2174 | 69 21 20 | 2188 | 67 32 34 | 2201 |
| | Pollux | E. | 101 5 8 | 2150 | 99 15 25 | 2162 | 97 26 0 | 2175 | 95 36 55 | 2189 |
| 10 | Sun | W. | 63 9 44 | 2595 | 64 48 46 | 2610 | 66 27 27 | 2626 | 68 5 47 | 2641 |
| | Jupiter | W. | 44 57 41 | 2339 | 46 42 44 | 2354 | 48 27 26 | 2368 | 50 11 47 | 2383 |
| | Aldebaran | E. | 43 21 56 | 2371 | 41 37 40 | 2394 | 39 53 57 | 2419 | 38 10 49 | 2445 |
| | Saturn | E. | 58 34 3 | 2276 | 56 47 28 | 2291 | 55 1 16 | 2308 | 53 15 28 | 2325 |
| | Pollux | E. | 86 36 38 | 2259 | 84 49 38 | 2273 | 83 2 59 | 2288 | 81 16 42 | 2303 |
| 11 | Sun | W. | 76 12 7 | 2722 | 77 48 18 | 2738 | 79 24 8 | 2754 | 80 59 36 | 2770 |
| | Jupiter | W. | 58 48 8 | 2459 | 60 30 19 | 2475 | 62 12 8 | 2489 | 63 53 36 | 2504 |
| | α Pegasi | W. | 49 43 51 | 2978 | 51 14 31 | 2965 | 52 45 28 | 2954 | 54 16 38 | 2946 |
| | Aldebaran | E. | 29 45 8 | 2607 | 28 6 22 | 2649 | 26 28 34 | 2698 | 24 51 51 | 2753 |
| | Saturn | E. | 44 32 32 | 2410 | 42 49 12 | 2429 | 41 6 18 | 2446 | 39 23 49 | 2465 |
| | Pollux | E. | 72 30 49 | 2380 | 70 46 45 | 2395 | 69 3 3 | 2410 | 67 19 43 | 2425 |
| | Regulus | E. | 109 6 16 | 2389 | 107 22 25 | 2404 | 105 38 56 | 2419 | 103 55 48 | 2434 |
| 12 | Sun | W. | 88 51 38 | 2851 | 90 25 0 | 2867 | 91 58 1 | 2883 | 93 30 42 | 2898 |
| | Jupiter | W. | 72 15 37 | 2581 | 73 54 58 | 2596 | 75 33 59 | 2611 | 77 12 39 | 2625 |
| | α Pegasi | W. | 61 54 5 | 2935 | 63 25 39 | 2938 | 64 57 10 | 2941 | 66 28 37 | 2945 |
| | Saturn | E. | 30 58 13 | 2567 | 29 18 33 | 2591 | 27 39 26 | 2615 | 26 0 52 | 2640 |
| | Pollux | E. | 58 48 24 | 2502 | 57 7 13 | 2516 | 55 26 22 | 2531 | 53 45 52 | 2545 |
| | Regulus | E. | 95 25 29 | 2509 | 93 44 28 | 2523 | 92 3 47 | 2538 | 90 23 27 | 2553 |
| 13 | Sun | W. | 101 9 14 | 2973 | 102 40 0 | 2988 | 104 10 28 | 3002 | 105 40 38 | 3017 |
| | α Pegasi | W. | 74 4 17 | 2976 | 75 35 0 | 2985 | 77 5 32 | 2993 | 78 35 54 | 3001 |
| | α Arietis | W. | 30 35 46 | 2824 | 32 9 43 | 2819 | 33 43 46 | 2817 | 35 17 52 | 2815 |
| | Pollux | E. | 45 28 15 | 2615 | 43 49 41 | 2629 | 42 11 26 | 2643 | 40 33 29 | 2656 |
| | Regulus | E. | 82 6 40 | 2623 | 80 28 16 | 2636 | 78 50 10 | 2649 | 77 12 21 | 2662 |
| 14 | Sun | W. | 113 7 8 | 3084 | 114 35 37 | 3098 | 116 3 49 | 3110 | 117 31 46 | 3122 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | | | P. L. of Diff. | IIIh. | | | P. L. of Diff. | VIh. | | | P. L. of Diff. | IXh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 14 | α Pegasi | W. | 80 | 6 | 5 | 3010 | 81 | 36 | 5 | 3021 | 83 | 5 | 52 | 3030 | 84 | 35 | 27 | 3041 |
| | α Arietis | W. | 36 | 52 | 0 | 2816 | 38 | 26 | 7 | 2818 | 40 | 0 | 11 | 2821 | 41 | 34 | 11 | 2825 |
| | Pollux | E. | 38 | 55 | 50 | 2669 | 37 | 18 | 29 | 2682 | 35 | 41 | 25 | 2695 | 34 | 4 | 38 | 2707 |
| | Regulus | E. | 75 | 34 | 50 | 2675 | 73 | 57 | 37 | 2688 | 72 | 20 | 41 | 2701 | 70 | 44 | 2 | 2713 |
| 15 | Sun | W. | 118 | 59 | 29 | 3134 | 120 | 26 | 57 | 3147 | 121 | 54 | 10 | 3158 | 123 | 21 | 9 | 3169 |
| | α Arietis | W. | 49 | 22 | 41 | 2853 | 50 | 56 | 0 | 2819 | 52 | 29 | 11 | 2866 | 54 | 2 | 13 | 2873 |
| | Aldebaran | W. | 19 | 55 | 5 | 3212 | 21 | 21 | 0 | 3164 | 22 | 47 | 52 | 3125 | 24 | 15 | 31 | 3096 |
| | Pollux | E. | 26 | 4 | 48 | 2768 | 24 | 29 | 38 | 2779 | 22 | 54 | 43 | 2792 | 21 | 20 | 3 | 2804 |
| | Regulus | E. | 62 | 44 | 44 | 2771 | 61 | 9 | 38 | 2782 | 59 | 34 | 46 | 2793 | 58 | 0 | 9 | 2804 |
| | Mars | E. | 115 | 43 | 7 | 2797 | 114 | 8 | 35 | 2807 | 112 | 34 | 16 | 2817 | 111 | 0 | 10 | 2826 |
| | Spica | E. | 116 | 46 | 25 | 2763 | 115 | 11 | 9 | 2774 | 113 | 36 | 7 | 2784 | 112 | 1 | 18 | 2794 |
| 16 | α Arietis | W. | 61 | 45 | 13 | 2909 | 63 | 17 | 22 | 2914 | 64 | 49 | 23 | 2921 | 66 | 21 | 15 | 2927 |
| | Aldebaran | W. | 31 | 40 | 33 | 3022 | 33 | 10 | 19 | 3016 | 34 | 40 | 12 | 3011 | 36 | 10 | 11 | 3009 |
| | Saturn | W. | 15 | 45 | 51 | 3075 | 17 | 14 | 31 | 3044 | 18 | 43 | 49 | 3024 | 20 | 13 | 32 | 3008 |
| | Regulus | E. | 50 | 10 | 27 | 2854 | 48 | 37 | 9 | 2864 | 47 | 4 | 4 | 2874 | 45 | 31 | 12 | 2883 |
| | Mars | E. | 103 | 12 | 42 | 2872 | 101 | 39 | 47 | 2880 | 100 | 7 | 2 | 2888 | 98 | 34 | 28 | 2897 |
| | Spica | E. | 102 | 36 | 50 | 2841 | 104 | 10 | 25 | 2850 | 101 | 3 | 27 | 2859 | 99 | 30 | 15 | 2867 |
| 17 | α Arietis | W. | 73 | 58 | 28 | 2962 | 75 | 29 | 29 | 2967 | 77 | 0 | 23 | 2973 | 78 | 31 | 9 | 2980 |
| | Aldebaran | W. | 43 | 40 | 28 | 3008 | 45 | 10 | 30 | 3010 | 46 | 40 | 30 | 3012 | 48 | 10 | 28 | 3015 |
| | Saturn | W. | 27 | 45 | 24 | 2981 | 29 | 16 | 0 | 2981 | 30 | 46 | 37 | 2981 | 32 | 17 | 13 | 2982 |
| | Regulus | E. | 37 | 49 | 46 | 2929 | 36 | 18 | 4 | 2939 | 34 | 40 | 34 | 2948 | 33 | 15 | 16 | 2956 |
| | Mars | E. | 90 | 54 | 7 | 2933 | 89 | 22 | 30 | 2940 | 87 | 51 | 2 | 2946 | 86 | 19 | 42 | 2953 |
| | Spica | E. | 91 | 46 | 51 | 2906 | 90 | 14 | 40 | 2912 | 88 | 42 | 37 | 2920 | 87 | 10 | 44 | 2927 |
| 18 | α Arietis | W. | 86 | 3 | 3 | 3010 | 87 | 33 | 3 | 3016 | 89 | 2 | 56 | 3021 | 90 | 32 | 43 | 3026 |
| | Aldebaran | W. | 55 | 39 | 24 | 3030 | 57 | 9 | 0 | 3033 | 58 | 38 | 32 | 3037 | 60 | 7 | 59 | 3039 |
| | Saturn | W. | 39 | 49 | 37 | 2996 | 41 | 19 | 55 | 2999 | 42 | 50 | 9 | 3002 | 44 | 20 | 19 | 3005 |
| | Mars | E. | 78 | 45 | 0 | 2983 | 77 | 14 | 26 | 2988 | 75 | 43 | 58 | 2993 | 74 | 13 | 37 | 2998 |
| | Spica | E. | 79 | 33 | 23 | 2958 | 78 | 2 | 18 | 2965 | 76 | 31 | 21 | 2970 | 75 | 0 | 31 | 2976 |
| 19 | Aldebaran | W. | 67 | 34 | 14 | 3057 | 69 | 3 | 16 | 3060 | 70 | 32 | 14 | 3064 | 72 | 1 | 8 | 3068 |
| | Saturn | W. | 51 | 50 | 1 | 3024 | 53 | 19 | 44 | 3028 | 54 | 49 | 22 | 3030 | 56 | 18 | 57 | 3035 |
| | Pollux | W. | 23 | 22 | 33 | 3008 | 24 | 52 | 36 | 3010 | 26 | 22 | 36 | 3014 | 27 | 52 | 31 | 3018 |
| | Mars | E. | 66 | 43 | 22 | 3022 | 65 | 13 | 37 | 3026 | 63 | 43 | 57 | 3030 | 62 | 14 | 22 | 3034 |
| | Spica | E. | 67 | 28 | 02 | 3001 | 65 | 57 | 51 | 3006 | 64 | 27 | 46 | 3011 | 62 | 57 | 47 | 3015 |
| | Antares | E. | 113 | 20 | 56 | 2998 | 111 | 50 | 41 | 3002 | 110 | 20 | 31 | 3007 | 108 | 50 | 27 | 3012 |
| 20 | Aldebaran | W. | 79 | 24 | 33 | 3084 | 80 | 53 | 2 | 3087 | 82 | 21 | 27 | 3090 | 83 | 49 | 49 | 3093 |
| | Saturn | W. | 63 | 45 | 44 | 3052 | 65 | 14 | 53 | 3054 | 66 | 43 | 59 | 3058 | 68 | 13 | 0 | 3060 |
| | Pollux | W. | 35 | 20 | 59 | 3035 | 36 | 50 | 28 | 3039 | 38 | 19 | 53 | 3042 | 39 | 49 | 14 | 3044 |
| | Mars | E. | 54 | 47 | 39 | 3052 | 53 | 18 | 31 | 3056 | 51 | 49 | 28 | 3060 | 50 | 20 | 29 | 3063 |
| | Spica | E. | 55 | 29 | 12 | 3036 | 53 | 59 | 44 | 3039 | 52 | 30 | 20 | 3043 | 51 | 1 | 1 | 3047 |
| | Antares | E. | 101 | 21 | 26 | 3031 | 99 | 51 | 52 | 3034 | 98 | 22 | 22 | 3039 | 96 | 52 | 57 | 3041 |
| 21 | Aldebaran | W. | 91 | 10 | 44 | 3108 | 92 | 38 | 44 | 3110 | 94 | 6 | 42 | 3112 | 95 | 34 | 37 | 3114 |
| | Saturn | W. | 75 | 37 | 18 | 3074 | 77 | 5 | 59 | 3076 | 78 | 34 | 38 | 3078 | 80 | 3 | 14 | 3080 |
| | Pollux | W. | 47 | 15 | 9 | 3058 | 48 | 44 | 10 | 3060 | 50 | 13 | 9 | 3062 | 51 | 42 | 5 | 3064 |
| | Mars | E. | 42 | 56 | 27 | 3076 | 41 | 27 | 48 | 3079 | 39 | 59 | 13 | 3082 | 38 | 30 | 41 | 3085 |
| | Spica | E. | 43 | 35 | 28 | 3063 | 42 | 6 | 33 | 3065 | 40 | 37 | 41 | 3068 | 39 | 8 | 52 | 3071 |
| | Antares | E. | 89 | 26 | 45 | 3056 | 87 | 57 | 41 | 3058 | 86 | 28 | 40 | 3060 | 84 | 59 | 43 | 3062 |
| 22 | Aldebaran | W. | 102 | 53 | 32 | 3124 | 104 | 21 | 12 | 3127 | 105 | 48 | 49 | 3129 | 107 | 16 | 24 | 3129 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 14 | α Pegasi | W. | 86 4 49 | 3052 | 87 33 58 | 3062 | 89 2 54 | 3073 | 90 31 37 | 3084 |
| | α Arietis | W. | 43 8 6 | 2830 | 44 41 55 | 2835 | 46 15 38 | 2841 | 47 49 13 | 2846 |
| | Pollux | E. | 32 28 8 | 2719 | 30 51 53 | 2732 | 29 15 55 | 2744 | 27 40 13 | 2756 |
| | Regulus | E. | 69 7 39 | 2725 | 67 31 32 | 2737 | 65 55 41 | 2748 | 64 20 5 | 2260 |
| 15 | Sun | W. | 124 47 55 | 3181 | 126 14 27 | 3193 | 127 40 45 | 3204 | 129 6 50 | 3214 |
| | α Arietis | W. | 55 35 7 | 2880 | 57 7 52 | 2887 | 58 40 28 | 2894 | 60 12 55 | 2901 |
| | Aldebaran | W. | 25 43 46 | 3072 | 27 12 30 | 3054 | 28 41 36 | 3041 | 30 10 58 | 3030 |
| | Pollux | E. | 19 45 40 | 2815 | 18 11 33 | 2828 | 16 37 42 | 2841 | 15 4 7 | 2855 |
| | Regulus | E. | 56 25 46 | 2815 | 54 51 37 | 2825 | 53 17 41 | 2835 | 51 43 58 | 2844 |
| | Mars | E. | 109 26 16 | 2836 | 107 52 35 | 2845 | 106 19 6 | 2854 | 104 45 48 | 2863 |
| | Spica | E. | 110 26 42 | 2804 | 108 52 19 | 2814 | 107 18 9 | 2824 | 105 44 11 | 2832 |
| 16 | α Arietis | W. | 67 52 59 | 2935 | 69 24 35 | 2942 | 70 56 1 | 2949 | 72 27 18 | 2954 |
| | Aldebaran | W. | 37 40 12 | 3007 | 39 10 16 | 3007 | 40 40 20 | 3006 | 42 10 25 | 3007 |
| | Saturn | W. | 21 43 35 | 2997 | 23 13 52 | 2990 | 24 44 17 | 2985 | 26 14 48 | 2981 |
| | Regulus | E. | 43 58 31 | 2892 | 42 26 2 | 2901 | 40 53 45 | 2911 | 39 21 40 | 2920 |
| | Mars | E. | 97 2 5 | 2904 | 95 29 51 | 2912 | 93 57 47 | 2919 | 92 25 52 | 2927 |
| | Spica | E. | 97 57 14 | 2876 | 96 24 24 | 2883 | 94 51 43 | 2891 | 93 19 12 | 2898 |
| 17 | α Arietis | W. | 80 1 47 | 2986 | 81 32 17 | 2992 | 83 2 40 | 2998 | 84 32 55 | 3004 |
| | Aldebaran | W. | 49 40 22 | 3018 | 51 10 13 | 3021 | 52 40 0 | 3023 | 54 9 44 | 3026 |
| | Saturn | W. | 33 47 48 | 2985 | 35 18 20 | 2987 | 36 48 49 | 2989 | 38 19 15 | 2993 |
| | Regulus | E. | 31 44 10 | 2967 | 30 13 16 | 2977 | 28 42 35 | 2987 | 27 12 6 | 2999 |
| | Mars | E. | 84 48 30 | 2959 | 83 17 26 | 2965 | 81 46 30 | 2971 | 80 15 41 | 2977 |
| | Spica | E. | 85 38 59 | 2934 | 84 7 23 | 2940 | 82 35 55 | 2946 | 81 4 35 | 2953 |
| 18 | α Arietis | W. | 92 2 24 | 3032 | 93 31 57 | 3037 | 95 1 24 | 3043 | 96 30 44 | 3047 |
| | Aldebaran | W. | 61 37 23 | 3043 | 63 6 42 | 3047 | 64 35 57 | 3051 | 66 5 7 | 3054 |
| | Saturn | W. | 45 50 24 | 3009 | 47 20 26 | 3014 | 48 50 22 | 3017 | 50 20 14 | 3021 |
| | Mars | E. | 72 43 22 | 3003 | 71 13 13 | 3008 | 69 43 10 | 3913 | 68 13 13 | 3018 |
| | Spica | E. | 73 29 48 | 2981 | 71 59 12 | 2986 | 70 28 42 | 2992 | 68 58 19 | 2997 |
| 19 | Aldebaran | W. | 73 29 57 | 3071 | 74 58 42 | 3074 | 76 27 23 | 3078 | 77 56 0 | 3081 |
| | Saturn | W. | 57 48 26 | 3038 | 59 17 53 | 3342 | 60 47 13 | 3045 | 62 16 30 | 3047 |
| | Pollux | W. | 29 22 21 | 3022 | 30 52 6 | 3026 | 32 21 47 | 3028 | 33 51 25 | 3031 |
| | Mars | E. | 60 44 52 | 3039 | 59 15 27 | 3043 | 57 46 7 | 3046 | 56 16 51 | 3049 |
| | Spica | E. | 61 27 53 | 3020 | 59 58 5 | 3024 | 58 28 22 | 3028 | 56 58 44 | 3032 |
| | Antares | E. | 107 20 29 | 3016 | 105 50 36 | 3020 | 104 20 48 | 3024 | 102 51 5 | 3027 |
| 20 | Aldebaran | W. | 85 18 7 | 3096 | 86 46 22 | 3099 | 88 14 33 | 3102 | 89 42 40 | 3105 |
| | Saturn | W. | 69 41 59 | 3064 | 71 10 53 | 3066 | 72 39 44 | 3068 | 78 8 33 | 3072 |
| | Pollux | W. | 41 18 32 | 3047 | 42 47 46 | 3050 | 44 16 57 | 3053 | 45 46 4 | 3056 |
| | Mars | E. | 48 51 34 | 3065 | 47 22 42 | 3069 | 45 53 54 | 3071 | 44 25 9 | 3073 |
| | Spica | E. | 49 31 46 | 3050 | 47 2 35 | 3054 | 46 33 29 | 3057 | 45 4 27 | 3060 |
| | Antares | E. | 95 23 35 | 3044 | 93 54 17 | 3047 | 92 25 3 | 3050 | 90 55 52 | 3053 |
| 21 | Aldebaran | W. | 97 2 29 | 3117 | 98 30 18 | 3119 | 99 58 5 | 3120 | 101 25 50 | 3123 |
| | Saturn | W. | 81 31 48 | 3082 | 83 0 20 | 3084 | 84 28 49 | 3085 | 85 57 17 | 3687 |
| | Pollux | W. | 53 10 59 | 3065 | 54 39 51 | 3068 | 56 8 40 | 3069 | 57 37 28 | 3070 |
| | Mars | E. | 37 2 11 | 3086 | 35 33 44 | 3088 | 34 5 20 | 3091 | 32 36 59 | 3092 |
| | Spica | E. | 37 40 7 | 3073 | 36 11 25 | 3076 | 34 42 45 | 3078 | 33 14 10 | 3081 |
| | Antares | E. | 83 30 47 | 3064 | 82 1 53 | 3066 | 80 33 2 | 3068 | 79 4 13 | 3069 |
| 22 | Aldebaran | W. | 108 43 58 | 3131 | 110 11 30 | 3133 | 111 39 0 | 3133 | 113 6 29 | 3134 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 22 | Saturn | W. | 87 25 43 | 3087 | 88 54 9 | 3087 | 90 22 34 | 3088 | 91 50 58 | 3089 |
| | Pollux | W. | 59 6 14 | 3072 | 60 34 58 | 3072 | 62 3 42 | 3073 | 63 32 25 | 3073 |
| | Regulus | W. | 22 44 52 | 3131 | 24 12 24 | 3126 | 25 40 2 | 3121 | 27 7 46 | 3117 |
| | Mars | E. | 31 8 40 | 3095 | 29 40 24 | 3096 | 28 12 10 | 3099 | 26 43 59 | 3101 |
| | Spica | E. | 31 45 38 | 3083 | 30 17 8 | 3085 | 28 48 40 | 3087 | 27 20 15 | 3090 |
| | Antares | E. | 77 35 25 | 3070 | 76 6 38 | 3071 | 74 37 53 | 3072 | 73 9 9 | 3072 |
| 23 | Saturn | W. | 99 12 45 | 3091 | 100 41 6 | 3091 | 102 9 27 | 3090 | 103 37 49 | 3088 |
| | Pollux | W. | 70 55 53 | 3073 | 72 24 36 | 3072 | 73 53 20 | 3071 | 75 22 5 | 3070 |
| | Regulus | W. | 34 27 32 | 3101 | 35 55 40 | 3098 | 37 23 52 | 3096 | 38 52 7 | 3092 |
| | Antares | E. | 65 45 34 | 3073 | 64 16 51 | 3072 | 62 48 7 | 3070 | 61 19 21 | 3069 |
| | Venus | E. | 114 42 7 | 3566 | 113 22 56 | 3565 | 112 3 44 | 3564 | 110 44 30 | 3563 |
| 24 | Saturn | W. | 111 0 2 | 3081 | 112 28 35 | 3079 | 113 57 10 | 3075 | 115 25 50 | 3073 |
| | Pollux | W. | 82 46 18 | 3060 | 84 15 17 | 3057 | 85 44 19 | 3054 | 87 13 25 | 3051 |
| | Regulus | W. | 46 14 18 | 3077 | 47 42 56 | 3073 | 49 11 38 | 3069 | 50 40 25 | 3065 |
| | Antares | E. | 53 55 3 | 3060 | 52 26 5 | 3056 | 50 57 2 | 3054 | 49 27 56 | 3051 |
| | α Aquilæ | E. | 103 6 34 | 3945 | 101 54 0 | 3932 | 100 41 13 | 3920 | 99 28 14 | 3911 |
| | Venus | E. | 104 7 47 | 3549 | 102 48 17 | 3545 | 101 28 43 | 3542 | 100 9 5 | 3537 |
| 25 | Pollux | W. | 94 40 8 | 3028 | 96 9 46 | 3022 | 97 39 31 | 3017 | 99 9 23 | 3011 |
| | Regulus | W. | 58 5 45 | 3040 | 59 35 8 | 3034 | 61 4 38 | 3028 | 62 34 16 | 3022 |
| | Antares | E. | 42 1 12 | 3028 | 40 31 34 | 3023 | 39 1 50 | 3018 | 37 32 0 | 3011 |
| | α Aquilæ | E. | 93 20 53 | 3866 | 92 6 59 | 3858 | 90 52 57 | 3853 | 89 38 49 | 3846 |
| | Venus | E. | 93 29 38 | 3512 | 92 9 27 | 3505 | 90 49 8 | 3499 | 89 28 43 | 3493 |
| | Sun | E. | 130 11 33 | 3426 | 128 49 46 | 3419 | 127 27 51 | 3412 | 126 5 48 | 3406 |
| 26 | Regulus | W. | 70 4 34 | 2985 | 71 35 6 | 2976 | 73 5 49 | 2967 | 74 36 43 | 2958 |
| | Mars | W. | 16 46 38 | 3015 | 18 16 32 | 2998 | 19 46 47 | 2983 | 21 17 21 | 2969 |
| | Spica | W. | 16 4 45 | 3017 | 17 34 37 | 3002 | 19 4 47 | 2988 | 20 35 15 | 2975 |
| | Antares | E. | 30 0 43 | 2977 | 28 30 1 | 2968 | 26 59 8 | 2960 | 25 28 5 | 2951 |
| | Venus | E. | 82 44 33 | 3452 | 81 23 15 | 3442 | 80 1 46 | 3433 | 78 40 7 | 3423 |
| | α Aquilæ | E. | 83 26 49 | 3837 | 82 15 15 | 3834 | 80 57 38 | 3828 | 79 43 0 | 3822 |
| | Sun | E. | 119 13 23 | 3364 | 117 50 25 | 3353 | 116 27 15 | 3344 | 115 3 54 | 3332 |
| 27 | Regulus | W. | 82 14 18 | 2905 | 83 46 30 | 2894 | 85 18 57 | 2883 | 86 51 38 | 2870 |
| | Mars | W. | 28 54 35 | 2900 | 30 26 54 | 2887 | 31 59 30 | 2873 | 33 32 23 | 2859 |
| | Spica | W. | 28 11 36 | 2911 | 29 43 41 | 2899 | 31 16 1 | 2886 | 32 48 38 | 2873 |
| | Venus | E. | 71 48 53 | 3367 | 70 25 59 | 3354 | 69 2 50 | 3342 | 67 39 27 | 3329 |
| | α Aquilæ | E. | 73 29 55 | 3832 | 72 15 26 | 3836 | 71 1 3 | 3844 | 69 46 46 | 3852 |
| | Sun | E. | 108 4 0 | 3276 | 106 39 20 | 3263 | 105 14 25 | 3249 | 103 49 14 | 3236 |
| 28 | Regulus | E. | 94 39 10 | 2804 | 96 13 33 | 2790 | 97 48 14 | 2775 | 99 23 14 | 2760 |
| | Mars | W. | 41 21 28 | 2785 | 42 56 15 | 2770 | 44 31 22 | 2754 | 46 6 50 | 2738 |
| | Spica | W | 40 36 8 | 2804 | 42 10 32 | 2788 | 43 45 16 | 2772 | 45 20 21 | 2756 |
| | Venus | E. | 60 38 33 | 3257 | 59 13 31 | 3242 | 57 48 12 | 3226 | 56 22 34 | 3210 |
| | α Aquilæ | E. | 63 37 50 | 3915 | 62 24 45 | 3933 | 61 11 58 | 3954 | 59 59 33 | 3978 |
| | Sun | E. | 96 39 15 | 3163 | 95 12 22 | 3148 | 93 45 10 | 3131 | 92 17 38 | 3115 |
| 29 | Regulus | W. | 107 23 22 | 2681 | 109 0 28 | 2664 | 110 37 56 | 2647 | 112 15 47 | 2630 |
| | Mars | W. | 54 9 35 | 2655 | 55 47 16 | 2638 | 57 25 21 | 2620 | 59 3 50 | 2601 |
| | Spica | W. | 53 20 56 | 2675 | 54 58 9 | 2658 | 56 35 45 | 2641 | 58 13 44 | 2623 |
| | Venus | E. | 49 9 33 | 3127 | 47 41 56 | 3110 | 46 13 58 | 3092 | 44 45 39 | 3074 |
| | α Aquilæ | E. | 54 4 34 | 4155 | 52 55 25 | 4204 | 51 47 3 | 4261 | 50 39 34 | 4322 |
| | Sun | E. | 84 54 52 | 3028 | 83 25 14 | 3009 | 81 55 13 | 2991 | 80 24 49 | 2972 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 22 | Saturn | W. | 93 19 21 | 3090 | 94 47 43 | 3091 | 96 16 4 | 3091 | 97 44 24 | 3091 |
| | Pollux | W. | 65 1 7 | 3073 | 66 29 49 | 3074 | 67 58 30 | 3074 | 69 27 11 | 3073 |
| | Regulus | W. | 28 35 35 | 3114 | 30 3 28 | 3110 | 31 31 26 | 3107 | 32 59 27 | 3104 |
| | Mars | E. | 25 15 51 | 3104 | 23 47 46 | 3108 | 22 19 46 | 3111 | 20 51 50 | 3114 |
| | Spica | E. | 25 51 53 | 3092 | 24 23 34 | 3096 | 22 55 19 | 3098 | 21 27 7 | 3101 |
| | Antares | E. | 71 40 25 | 3073 | 70 11 42 | 3073 | 68 42 59 | 3073 | 67 14 17 | 3078 |
| 23 | Saturn | W. | 105 6 13 | 3088 | 106 34 37 | 3086 | 108 3 4 | 3085 | 109 31 32 | 3088 |
| | Pollux | W. | 76 50 51 | 3069 | 78 19 39 | 3067 | 79 48 29 | 3065 | 81 17 22 | 3062 |
| | Regulus | W. | 40 20 26 | 3090 | 41 48 48 | 3087 | 43 17 14 | 3083 | 44 45 44 | 3080 |
| | Antares | E. | 59 50 34 | 3068 | 58 21 45 | 3065 | 56 52 53 | 3064 | 55 23 59 | 3062 |
| | Venus | E. | 109 25 15 | 3560 | 108 5 57 | 3557 | 106 46 36 | 3555 | 105 27 13 | 3552 |
| 24 | Saturn | W. | 116 54 32 | 3071 | 118 23 17 | 3067 | 119 52 7 | 3064 | 121 21 1 | 3059 |
| | Pollux | W. | 88 42 35 | 3047 | 90 11 50 | 3043 | 91 41 10 | 3038 | 93 10 36 | 3033 |
| | Regulus | W. | 52 9 17 | 3060 | 53 38 15 | 3056 | 55 7 19 | 3051 | 56 36 29 | 3046 |
| | Antares | E. | 47 58 45 | 3047 | 46 29 30 | 3042 | 45 0 9 | 3038 | 43 30 43 | 3034 |
| | α Aquilæ | E. | 98 15 5 | 3901 | 97 1 46 | 3891 | 95 48 17 | 3882 | 94 34 39 | 3874 |
| | Venus | E. | 98 49 22 | 3533 | 97 29 34 | 3528 | 96 9 41 | 3524 | 94 49 43 | 3517 |
| 25 | Pollux | W. | 100 39 22 | 3005 | 102 9 29 | 2997 | 103 39 45 | 2991 | 105 10 9 | 2982 |
| | Regulus | W. | 64 4 2 | 3016 | 65 33 55 | 3008 | 67 3 58 | 3000 | 68 34 11 | 2992 |
| | Antares | E. | 36 2 1 | 3005 | 34 31 54 | 2998 | 33 1 39 | 2992 | 31 31 16 | 2984 |
| | α Aquilæ | E. | 88 24 34 | 3841 | 87 10 14 | 3836 | 85 56 49 | 3832 | 84 41 20 | 3830 |
| | Venus | E. | 88 8 11 | 3485 | 86 47 30 | 3478 | 85 26 39 | 3470 | 84 5 41 | 3961 |
| | Sun | E. | 124 43 38 | 3398 | 123 21 19 | 3389 | 121 58 50 | 3380 | 120 36 11 | 3372 |
| 26 | Regulus | W. | 76 7 49 | 2948 | 77 39 7 | 2938 | 79 10 38 | 2928 | 80 42 21 | 2917 |
| | Mars | W. | 22 48 13 | 2955 | 24 19 22 | 2941 | 25 50 49 | 2927 | 27 22 33 | 2913 |
| | Spica | W. | 22 5 59 | 2962 | 23 36 59 | 2950 | 25 8 15 | 2936 | 26 39 48 | 2924 |
| | Antares | E. | 23 56 51 | 2942 | 22 25 26 | 2933 | 20 53 49 | 2924 | 19 22 0 | 2913 |
| | Venus | E. | 77 18 17 | 3412 | 75 56 16 | 3401 | 74 34 1 | 3391 | 73 11 34 | 3379 |
| | α Aquilæ | E. | 78 28 21 | 3823 | 77 13 43 | 3823 | 75 59 5 | 3825 | 74 44 29 | 3828 |
| | Sun | E. | 113 40 21 | 3323 | 112 16 36 | 3311 | 110 52 37 | 3300 | 109 28 25 | 3288 |
| 27 | Regulus | W. | 88 24 35 | 2858 | 89 57 48 | 2845 | 91 31 18 | 2831 | 93 5 5 | 2818 |
| | Mars | W. | 35 5 35 | 2843 | 36 39 5 | 2830 | 38 12 54 | 2816 | 39 47 1 | 2801 |
| | Spica | W. | 34 21 32 | 2859 | 35 54 44 | 2845 | 37 28 14 | 2831 | 39 2 2 | 2818 |
| | Venus | E. | 66 15 49 | 3314 | 64 51 54 | 3301 | 63 27 44 | 3287 | 62 3 17 | 3272 |
| | α Aquilæ | E. | 68 32 37 | 3860 | 67 18 37 | 3871 | 66 4 48 | 3884 | 64 51 12 | 3898 |
| | Sun | E. | 102 23 47 | 3223 | 100 58 4 | 3209 | 99 32 5 | 3194 | 98 5 49 | 3178 |
| 28 | Regulus | W. | 100 58 34 | 2745 | 102 34 14 | 2729 | 104 10 15 | 2713 | 105 47 38 | 2697 |
| | Mars | W. | 47 42 39 | 2722 | 49 18 49 | 2705 | 50 55 22 | 2689 | 52 32 17 | 2672 |
| | Spica | W. | 46 55 46 | 2741 | 48 31 31 | 2725 | 50 7 38 | 2709 | 51 44 6 | 2692 |
| | Venus | E. | 54 56 37 | 3194 | 53 30 21 | 3178 | 52 3 46 | 3161 | 50 36 50 | 3143 |
| | α Aquilæ | E. | 58 47 32 | 4005 | 57 35 59 | 4036 | 56 24 55 | 4072 | 55 14 26 | 4110 |
| | Sun | E. | 90 49 47 | 3098 | 89 21 35 | 3081 | 87 53 2 | 3864 | 86 24 8 | 3046 |
| 29 | Regulus | W. | 113 54 1 | 2613 | 115 32 38 | 2596 | 117 11 39 | 2578 | 118 51 4 | 2559 |
| | Mars | W. | 60 42 44 | 2583 | 62 22 3 | 2564 | 64 1 47 | 2545 | 65 41 57 | 2527 |
| | Spica | W. | 59 52 8 | 2605 | 61 30 56 | 2588 | 63 10 8 | 2569 | 64 49 45 | 2551 |
| | Venus | E. | 43 16 58 | 3057 | 41 47 56 | 3040 | 40 18 33 | 3022 | 38 48 48 | 3005 |
| | α Aquilæ | E. | 49 53 2 | 4394 | 48 27 35 | 4474 | 47 23 20 | 4562 | 46 20 22 | 4658 |
| | Sun | E. | 78 54 1 | 2954 | 77 22 50 | 2934 | 75 51 14 | 2914 | 74 19 13 | 2894 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be added to Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semidiameter. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Sat. | 1 | 22 50 25.89 | 9.352 | S. 7 23 29.5 | 57.12 | 16 10.22 | 65.39 | 12 30.23 | 0.505 |
| *Sun.* | 2 | 22 54 10.06 | 9.332 | 7 0 35.5 | 57.38 | 16 9.97 | 65.32 | 12 17.87 | 0.525 |
| Mon. | 3 | 22 57 53.77 | 9.312 | 6 37 35.4 | 57.64 | 16 9.71 | 65.25 | 12 5.07 | 0.545 |
| Tues. | 4 | 23 1 37.01 | 9.294 | 6 14 29.6 | 57.85 | 16 9.45 | 65.18 | 11 51.80 | 0.563 |
| Wed. | 5 | 23 5 19.81 | 9.277 | 5 51 18.6 | 58.06 | 16 9.19 | 65.12 | 11 38.08 | 0.580 |
| Thur. | 6 | 23 9 2.20 | 9.259 | 5 28 2.9 | 58.25 | 16 8.93 | 65.06 | 11 23.96 | 0.597 |
| Fri. | 7 | 23 12 44.17 | 9.243 | 5 4 42.7 | 58.44 | 16 8.67 | 65.00 | 11 9.42 | 0.614 |
| Sat. | 8 | 23 16 25.77 | 9.227 | 4 41 18.5 | 58.59 | 16 8.41 | 64.94 | 10 54.49 | 0.630 |
| *Sun.* | 9 | 23 20 6.98 | 9.211 | 4 17 50.8 | 58.74 | 16 8.16 | 64.89 | 10 39.19 | 0.645 |
| Mon. | 10 | 23 23 47.84 | 9.197 | 3 54 19.9 | 58.84 | 16 7.90 | 64.85 | 10 23.53 | 0.660 |
| Tues. | 11 | 23 27 28.36 | 9.183 | 3 30 46.3 | 58.95 | 16 7.64 | 64.80 | 10 7.54 | 0.673 |
| Wed. | 12 | 23 31 8.54 | 9.170 | 3 7 10.5 | 59.04 | 16 7.38 | 64.76 | 9 51.21 | 0.686 |
| Thur. | 13 | 23 34 48.42 | 9.157 | 2 43 32.5 | 59.13 | 16 7.11 | 64.71 | 9 34.59 | 0.699 |
| Fri. | 14 | 23 38 28.05 | 9.146 | 2 19 53.0 | 59.17 | 16 6.84 | 64.67 | 9 17.71 | 0.710 |
| Sat. | 15 | 23 42 7.39 | 9.136 | 1 56 12.4 | 59.22 | 16 6.58 | 64.64 | 9 0.54 | 0.721 |
| *Sun.* | 16 | 23 45 46.49 | 9.126 | 1 32 30.8 | 59.24 | 16 6.31 | 64.60 | 8 43.13 | 0.730 |
| Mon. | 17 | 23 49 25.36 | 9.117 | 1 8 48.7 | 59.27 | 16 6.05 | 64.57 | 8 25.51 | 0.739 |
| Tues. | 18 | 23 53 4.05 | 9.109 | 0 45 6.7 | 59.26 | 16 5.78 | 64.54 | 8 7.70 | 0.747 |
| Wed. | 19 | 23 56 42.56 | 9.103 | S. 0 21 24.8 | 59.25 | 16 5.52 | 64.52 | 7 49.72 | 0.753 |
| Thur. | 20 | 0 0 20.94 | 9.098 | N. 0 2 16.5 | 59.21 | 16 5.25 | 64.50 | 7 31.57 | 0.759 |
| Fri. | 21 | 0 3 59.16 | 9.092 | 0 25 57.0 | 59.17 | 16 4.98 | 64.48 | 7 13.28 | 0.764 |
| Sat. | 22 | 0 7 37.28 | 9.088 | 0 49 36.3 | 59.11 | 16 4.70 | 64.47 | 6 54.90 | 0.769 |
| *Sun.* | 23 | 0 11 15.35 | 9.086 | 1 13 13.9 | 59.05 | 16 4.42 | 64.45 | 6 36.45 | 0.770 |
| Mon. | 24 | 0 14 53.34 | 9.084 | 1 36 49.7 | 58.96 | 16 4.14 | 64.47 | 6 17.95 | 0.770 |
| Tues. | 25 | 0 18 31.30 | 9.084 | 2 0 23.2 | 58.86 | 16 3.85 | 64.47 | 5 59.41 | 0.771 |
| Wed. | 26 | 0 22 9.27 | 9.084 | 2 23 54.3 | 58.74 | 16 3.57 | 64.47 | 5 40.88 | 0.771 |
| Thur. | 27 | 0 25 47.24 | 9.086 | 2 47 22.4 | 58.61 | 16 3.29 | 64.47 | 5 22.34 | 0.770 |
| Fri. | 28 | 0 29 25.27 | 9.087 | 3 10 47.4 | 58.47 | 16 3.00 | 64.46 | 5 3.87 | 0.769 |
| Sat. | 29 | 0 33 3.32 | 9.090 | 3 34 8.8 | 58.32 | 16 2.71 | 64.46 | 4 45.42 | 0.767 |
| *Sun.* | 30 | 0 36 41.46 | 9.094 | 3 57 26.3 | 58.15 | 16 2.43 | 64.47 | 4 27.05 | 0.763 |
| Mon. | 31 | 0 40 19.71 | 9.097 | 4 20 39.7 | 57.97 | 16 2.15 | 64.48 | 4 8.79 | 0.759 |
| Tues. | 32 | 0 43 58.05 | 9.102 | N. 4 43 48.3 | 57.77 | 16 1.87 | 64.50 | 3 50.63 | 0.754 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S *Apparent* Declination. | THE SUN'S Diff. for 1 hour. | Equation of Time, *to be subtracted from Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Sat. | 1 | 22 50 23.95 | 9.352 | S. 7 23 41.4 | 57.12 | 12 30.34 | 0.505 | 22 37 53.61 |
| *Sun.* | 2 | 22 54 8.15 | 9.332 | 7 00 47.2 | 57.38 | 12 17.98 | 0.525 | 22 41 50.17 |
| Mon. | 3 | 22 57 51.90 | 9.312 | 6 37 46.9 | 57.64 | 12 5.18 | 0.545 | 22 45 46.72 |
| Tues. | 4 | 23 1 35.18 | 9.294 | 6 14 40.9 | 57.85 | 11 51.91 | 0.563 | 22 49 43.27 |
| Wed. | 5 | 23 5 18.02 | 9.277 | 5 51 29.8 | 58.06 | 11 38.19 | 0.580 | 22 53 39.83 |
| Thur. | 6 | 23 9 0.45 | 9.259 | 5 28 13.9 | 58.25 | 11 24.07 | 0.597 | 22 57 36.38 |
| Fri. | 7 | 23 12 42.46 | 9.243 | 5 4 53.5 | 58.44 | 11 9.53 | 0.614 | 23 1 32.93 |
| Sat. | 8 | 23 16 24.10 | 9.227 | 4 41 29.1 | 58.59 | 10 54.61 | 0.630 | 23 5 29.49 |
| *Sun.* | 9 | 23 20 5.35 | 9.211 | 4 18 1.2 | 58.74 | 10 39.31 | 0.645 | 23 9 26.04 |
| Mon. | 10 | 23 23 46.25 | 9.197 | 3 54 30.1 | 58.84 | 10 23.65 | 0.660 | 23 13 22.60 |
| Tues. | 11 | 23 27 26.81 | 9.183 | 3 30 56.3 | 58.95 | 10 7.66 | 0.673 | 23 17 19.15 |
| Wed. | 12 | 23 31 7.04 | 9.170 | 3 7 20.2 | 59.04 | 9 51.33 | 0.686 | 23 21 15.71 |
| Thur. | 13 | 23 34 46.96 | 9.157 | 2 43 42.0 | 59.13 | 9 34.70 | 0.699 | 23 25 12.26 |
| Fri. | 14 | 23 38 26.63 | 9.146 | 2 20 2.2 | 59.17 | 9 17.82 | 0.710 | 23 29 8.81 |
| Sat. | 15 | 23 42 6.02 | 9.136 | 1 56 21.3 | 59.22 | 9 0.65 | 0.721 | 23 33 5.37 |
| *Sun.* | 16 | 23 45 45.16 | 9.126 | 1 32 39.5 | 59.24 | 8 43.24 | 0.730 | 23 37 1.92 |
| Mon. | 17 | 23 49 24.08 | 9.117 | 1 8 57.1 | 59.27 | 8 25.61 | 0.739 | 23 40 58.47 |
| Tues. | 18 | 23 53 2.82 | 9.109 | 0 45 14.8 | 59.26 | 8 7.80 | 0.747 | 23 44 55.02 |
| Wed. | 19 | 23 56 41.37 | 9.103 | S. 0 21 32.6 | 59.25 | 7 49.79 | 0.753 | 23 48 51.58 |
| Thur. | 20 | 0 0 19.80 | 9.098 | N. 0 2 9.0 | 59.21 | 7 31.67 | 0.759 | 23 52 48.13 |
| Fri. | 21 | 0 3 58.06 | 9.092 | 0 25 49.8 | 59.17 | 7 13.37 | 0.764 | 23 56 44.69 |
| Sat. | 22 | 0 7 36.23 | 9.088 | 0 49 29.4 | 59.11 | 6 54.99 | 0.769 | 0 0 41.24 |
| *Sun.* | 23 | 0 11 14.34 | 9.086 | 1 13 7.3 | 59.05 | 6 36.55 | 0.770 | 0 4 37.79 |
| Mon. | 24 | 0 14 52.38 | 9.084 | 1 36 43.4 | 58.96 | 6 18.03 | 0.770 | 0 8 34.35 |
| Tues. | 25 | 0 18 30.39 | 9.084 | 2 0 17.2 | 58.86 | 5 59.49 | 0.771 | 0 12 30.90 |
| Wed. | 26 | 0 22 8.40 | 9.084 | 2 23 48.6 | 58.74 | 5 40.95 | 0.771 | 0 16 27.45 |
| Thur. | 27 | 0 25 46.42 | 9.086 | 2 47 17.1 | 58.61 | 5 22.41 | 0.770 | 0 20 24.01 |
| Fri. | 28 | 0 29 24.49 | 9.087 | 3 10 42.4 | 58.47 | 5 3.93 | 0.769 | 0 24 20.56 |
| Sat. | 29 | 0 33 2.59 | 9.090 | 3 34 4.1 | 58.32 | 4 45.48 | 0.767 | 0 28 17.11 |
| *Sun.* | 30 | 0 36 40.78 | 9.094 | 3 57 21.9 | 58.15 | 4 27.11 | 0.763 | 0 32 13.67 |
| Mon. | 31 | 0 40 19.07 | 9.097 | 4 20 35.6 | 57.97 | 4 8.85 | 0.759 | 0 36 10.22 |
| Tues. | 32 | 0 43 57.46 | 9.102 | N. 4 43 44.6 | 57.77 | 3 50.68 | 0.754 | 0 40 6.78 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S *True* LONGITUDE. λ | THE SUN'S *True* LONGITUDE. λ′ | Diff. for 1 hour. | LATITUDE. | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 61 | 341 8 39.0 | 8 37.4 | 150.40 | —0.71 | 9.9963170 | 47.0 | 1 21 52.94 |
| 2 | 62 | 342 8 47.5 | 8 45.8 | 150.33 | 0.75 | .9964300 | 47.3 | 1 17 57.04 |
| 3 | 63 | 343 8 54.4 | 8 52.6 | 150.26 | 0.76 | .9965437 | 47.5 | 1 14 1.12 |
| 4 | 64 | 344 8 59.6 | 8 57.7 | 150.18 | 0.73 | .9966580 | 47.7 | 1 10 5.21 |
| 5 | 65 | 345 9 3.0 | 9 1.0 | 150.10 | 0.68 | .9967728 | 47.9 | 1 6 9.30 |
| 6 | 66 | 346 9 4.4 | 9 2.3 | 150.02 | 0.61 | .9968879 | 48.0 | 1 2 13.40 |
| 7 | 67 | 347 9 4.1 | 9 1.9 | 149.94 | 0.52 | .9970033 | 48.1 | 0 58 17.49 |
| 8 | 68 | 348 9 1.9 | 8 59.6 | 149.85 | 0.40 | .9971189 | 48.3 | 0 54 21.58 |
| 9 | 69 | 349 8 57.6 | 8 55.1 | 149.76 | 0.27 | .9972347 | 48.4 | 0 50 25.67 |
| 10 | 70 | 350 8 51.3 | 8 48.7 | 149.67 | 0.14 | .9973508 | 48.5 | 0 46 29.76 |
| 11 | 71 | 351 8 42.7 | 8 40.0 | 149.58 | —0.02 | .9974673 | 48.6 | 0 42 33.86 |
| 12 | 72 | 352 8 31.8 | 8 28.9 | 149.49 | +0.10 | .9975841 | 48.8 | 0 38 37.95 |
| 13 | 73 | 353 8 18.8 | 8 15.8 | 149.39 | 0.22 | .9977015 | 49.1 | 0 34 42.04 |
| 14 | 74 | 354 8 3.6 | 8 0.5 | 149.30 | 0.29 | .9978190 | 49.4 | 0 30 46.13 |
| 15 | 75 | 355 7 46.0 | 7 42.8 | 149.21 | 0.35 | .9979374 | 49.7 | 0 26 50.23 |
| 16 | 76 | 356 7 26.1 | 7 22.8 | 149.12 | 0.36 | .9980566 | 50.0 | 0 22 54.32 |
| 17 | 77 | 357 7 4.0 | 7 0.6 | 149.03 | 0.35 | .9981766 | 50.3 | 0 18 58.41 |
| 18 | 78 | 358 6 39.6 | 6 36.1 | 148.94 | 0.31 | .9982975 | 50.7 | 0 15 2.50 |
| 19 | 79 | 359 6 13.0 | 6 9.4 | 148.85 | 0.24 | .9984193 | 51.1 | 0 11 6.60 |
| 20 | 80 | 0 5 44.2 | 5 40.5 | 148.76 | 0.15 | .9985420 | 51.4 | 0 7 10.69 |
| 21 | 81 | 1 5 13.2 | 5 9.4 | 148.67 | +0.04 | .9986656 | 51.8 | 0 3 14.78<br>23 59 18.87 |
| 22 | 82 | 2 4 40.2 | 4 36.3 | 148.59 | —0.10 | .9987902 | 52.1 | 23 55 22.96 |
| 23 | 83 | 3 4 5.4 | 4 1.0 | 148.51 | 0.24 | .9989158 | 52.3 | 23 51 27.05 |
| 24 | 84 | 4 3 28.6 | 3 24.5 | 148.43 | 0.36 | .9990422 | 52.7 | 23 47 31.15 |
| 25 | 85 | 5 2 49.8 | 2 45.6 | 148.35 | 0.49 | .9991692 | 53.0 | 23 43 35.24 |
| 26 | 86 | 6 2 9.1 | 2 4.8 | 148.27 | 0.61 | .9992968 | 53.2 | 23 39 39.33 |
| 27 | 87 | 7 1 26.8 | 1 22.4 | 148.19 | 0.70 | .9994249 | 53.2 | 23 35 43.42 |
| 28 | 88 | 8 0 42.8 | 0 38.3 | 148.12 | 0.78 | .9995532 | 53.2 | 23 31 47.52 |
| 29 | 89 | 8 59 56.9 | 59 52.2 | 148.04 | 0.82 | .9996815 | 53.2 | 23 27 51.61 |
| 30 | 90 | 9 59 9.2 | 59 4.4 | 147.97 | 0.84 | .9998098 | 53.3 | 23 23 55.70 |
| 31 | 91 | 10 58 19.8 | 58 14.9 | 147.90 | 0.82 | 9.9999379 | 53.3 | 23 19 59.79 |
| 32 | 92 | 11 57 28.6 | 57 23.6 | 147.82 | —0.78 | 0.0000656 | 53.2 | 23 16 3.89 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h m. | m. | d. |
| 1 | 15 44.4 | 15 52.2 | 57 39.2 | +2.36 | 58 8.0 | +2.42 | 20 3.1 | 2.46 | 24.1 |
| 2 | 16 0.2 | 16 8.1 | 58 37.2 | 2.43 | 59 6.2 | 2.38 | 21 4.3 | 2.44 | 25.1 |
| 3 | 16 15.7 | 16 22.9 | 59 34.2 | 2.27 | 60 0.6 | 2.10 | 22 4.7 | 2.37 | 26.1 |
| 4 | 16 29.4 | 16 35.1 | 60 24.7 | 1.88 | 60 45.7 | 1.59 | 23 2.6 | 2.26 | 27.1 |
| 5 | 16 39.8 | 16 43.3 | 61 2.9 | 1.25 | 61 15.8 | 0.88 | 23 57.7 | 2.16 | 28.1 |
| 6 | 16 45.5 | 16 46.4 | 61 24.0 | +0.48 | 61 27.2 | +0.05 | 6 | | 29.1 |
| 7 | 16 45.9 | 16 44.0 | 61 25.3 | −0.37 | 61 18.4 | −0.77 | 0 50.5 | 2.08 | 0.7 |
| 8 | 16 40.8 | 16 36.5 | 61 6.8 | 1.15 | 60 50.9 | 1.48 | 1 41.9 | 2.05 | 1.7 |
| 9 | 16 31.2 | 16 25.0 | 60 31.2 | 1.77 | 60 8.4 | 2.00 | 2 33.3 | 2.07 | 2.7 |
| 10 | 16 18.1 | 16 10.8 | 59 43.1 | 2.17 | 59 16.2 | 2.28 | 3 25.7 | 2.13 | 3.7 |
| 11 | 16 3.2 | 15 55.5 | 58 48.3 | 2.34 | 58 20.0 | 2.35 | 4 19.8 | 2.20 | 4.7 |
| 12 | 15 47.8 | 15 40.3 | 57 51.9 | 2.31 | 57 24.5 | 2.24 | 5 15.5 | 2.25 | 5.7 |
| 13 | 15 33.1 | 15 26.4 | 56 58.2 | 2.13 | 56 33.4 | 2.00 | 6 12.0 | 2.26 | 6.7 |
| 14 | 15 20.1 | 15 14.3 | 56 10.2 | 1.86 | 55 48.8 | 1.70 | 7 8.0 | 2.20 | 7.7 |
| 15 | 15 9.0 | 15 4.3 | 55 29.4 | 1.53 | 55 12.0 | 1.37 | 8 1.8 | 2.09 | 8.7 |
| 16 | 15 0.1 | 14 56.4 | 54 56.6 | 1.21 | 54 43.1 | 1.05 | 8 52.5 | 1.96 | 9.7 |
| 17 | 14 53.2 | 14 50.6 | 54 31.5 | 0.89 | 54 21.8 | 0.74 | 9 39.7 | 1.82 | 10.7 |
| 18 | 14 48.4 | 14 46.7 | 54 13.8 | 0.60 | 54 7.5 | 0.46 | 10 23.6 | 1.70 | 11.7 |
| 19 | 14 45.4 | 14 44.6 | 54 2.8 | 0.33 | 53 59.7 | −0.20 | 11 5.0 | 1.62 | 12.7 |
| 20 | 14 44.1 | 14 44.0 | 53 58.0 | −0.08 | 53 57.7 | +0.03 | 11 44.7 | 1.57 | 13.7 |
| 21 | 14 44.3 | 14 45.0 | 53 58.8 | +0.14 | 54 1.2 | 0.25 | 12 23.6 | 1.56 | 14.7 |
| 22 | 14 46.0 | 14 47.3 | 54 4.8 | 0.36 | 54 9.7 | 0.47 | 13 2.7 | 1.59 | 15.7 |
| 23 | 14 49.0 | 14 51.1 | 54 16.0 | 0.58 | 54 23.7 | 0.70 | 13 43.1 | 1.66 | 16.7 |
| 24 | 14 53.6 | 14 56.5 | 54 32.8 | 0.82 | 54 43.3 | 0.93 | 14 25.8 | 1.77 | 17.7 |
| 25 | 14 59.7 | 15 3.3 | 54 55.2 | 1.05 | 55 8.6 | 1.18 | 15 11.7 | 1.91 | 18.7 |
| 26 | 15 7.4 | 15 11.9 | 55 23.6 | 1.32 | 55 40.2 | 1.46 | 16 1.4 | 2.07 | 19.7 |
| 27 | 15 16.9 | 15 22.3 | 55 58.5 | 1.59 | 56 18.3 | 1.72 | 16 55.2 | 2.22 | 20.7 |
| 28 | 15 28.1 | 15 34.4 | 56 39.7 | 1.85 | 57 2.6 | 1.96 | 17 52.2 | 2.32 | 21.7 |
| 29 | 15 41.0 | 15 47.9 | 57 26.8 | 2.06 | 57 52.0 | 2.13 | 18 51.0 | 2.36 | 22.7 |
| 30 | 15 54.9 | 16 2.0 | 58 17.9 | 2.17 | 58 44.1 | 2.17 | 19 49.7 | 2.32 | 23.7 |
| 31 | 16 9.1 | 16 16.0 | 59 10.1 | 2.13 | 59 35.2 | 2.04 | 20 46.8 | 2.24 | 24.7 |
| 32 | 16 22.5 | 16 28.4 | 59 59.0 | +1.90 | 60 20.8 | +1.70 | 21 41.7 | 2.15 | 25.7 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SATURDAY 1. | | | | | MONDAY 3. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 52 50.75 | 2.5233 | S.28 3 15.4 | 1.784 | 0 | 19 57 12.62 | 2.6038 | S.25 59 24.5 | 7.056 |
| 1 | 17 55 22.29 | 2.5280 | 28 4 57.2 | 1.612 | 1 | 19 59 48.80 | 2.6020 | 25 52 15.4 | 7.243 |
| 2 | 17 57 54.12 | 2.5328 | 28 6 28.7 | 1.438 | 2 | 20 2 24.86 | 2.6000 | 25 44 55.3 | 7.426 |
| 3 | 18 0 26.23 | 2.5376 | 28 7 49.8 | 1.265 | 3 | 20 5 0.80 | 2.5980 | 25 37 24.3 | 7.608 |
| 4 | 18 2 58.63 | 2.5422 | 28 9 0.5 | 1.091 | 4 | 20 7 36.61 | 2.5958 | 25 29 42.3 | 7.791 |
| 5 | 18 5 31.30 | 2.5466 | 28 10 0.7 | 0.917 | 5 | 20 10 12.30 | 2.5938 | 25 21 49.4 | 7.973 |
| 6 | 18 8 4.22 | 2.5509 | 28 10 50.5 | 0.742 | 6 | 20 12 47.86 | 2.5915 | 25 13 45.5 | 8.155 |
| 7 | 18 10 37.40 | 2.5550 | 28 11 29.7 | 0.564 | 7 | 20 15 23.27 | 2.5888 | 25 5 30.8 | 8.334 |
| 8 | 18 13 10.82 | 2.5590 | 28 11 58.2 | 0.386 | 8 | 20 17 58.52 | 2.5861 | 24 57 5.4 | 8.512 |
| 9 | 18 15 44.48 | 2.5630 | 28 12 16.0 | 0.207 | 9 | 20 20 33.61 | 2.5835 | 24 48 29.3 | 8.691 |
| 10 | 18 18 18.37 | 2.5667 | 28 12 23.1 | 0.028 | 10 | 20 23 8.54 | 2.5808 | 24 39 42.5 | 8.868 |
| 11 | 18 20 52.48 | 2.5703 | 28 12 19.4 | 0.152 | 11 | 20 25 43.30 | 2.5778 | 24 30 45.1 | 9.044 |
| 12 | 18 23 26.81 | 2.5739 | 28 12 4.9 | 0.333 | 12 | 20 28 17.88 | 2.5748 | 24 21 37.2 | 9.219 |
| 13 | 18 26 1.35 | 2.5773 | 28 11 39.5 | 0.514 | 13 | 20 30 52.28 | 2.5718 | 24 12 18.8 | 9.394 |
| 14 | 18 28 36.08 | 2.5805 | 28 11 3.2 | 0.697 | 14 | 20 33 26.49 | 2.5685 | 24 2 49.9 | 9.567 |
| 15 | 18 31 11.00 | 2.5837 | 28 10 15.9 | 0.879 | 15 | 20 36 0.50 | 2.5653 | 23 53 10.7 | 9.739 |
| 16 | 18 33 46.11 | 2.5867 | 28 9 17.7 | 1.062 | 16 | 20 38 34.32 | 2.5620 | 23 43 21.2 | 9.910 |
| 17 | 18 36 21.39 | 2.5894 | 28 8 8.4 | 1.247 | 17 | 20 41 7.93 | 2.5585 | 23 33 21.5 | 10.080 |
| 18 | 18 38 56.83 | 2.5920 | 28 6 48.0 | 1.432 | 18 | 20 43 41.33 | 2.5550 | 23 23 11.6 | 10.249 |
| 19 | 18 41 32.43 | 2.5945 | 28 5 16.6 | 1.617 | 19 | 20 46 14 52 | 2.5513 | 23 12 51.6 | 10.416 |
| 20 | 18 44 8.17 | 2.5968 | 28 3 34.0 | 1.803 | 20 | 20 48 47.49 | 2.5477 | 23 2 21.7 | 10.582 |
| 21 | 18 46 44.05 | 2.5991 | 28 1 40.2 | 1.989 | 21 | 20 51 20.23 | 2.5438 | 22 51 41.8 | 10.747 |
| 22 | 18 49 20.06 | 2.6012 | 27 59 35.3 | 2.175 | 22 | 20 53 52 75 | 2.5400 | 22 40 52.0 | 10.911 |
| 23 | 18 51 56.19 | 2.6032 | S.27 57 19.2 | 2.362 | 23 | 20 56 25.03 | 2.5362 | S.22 29 52.5 | 11.073 |
| | SUNDAY 2. | | | | | TUESDAY 4. | | | |
| 0 | 18 54 32.43 | 2.6050 | S.27 54 51.8 | 2.550 | 0 | 20 58 57.08 | 2.5322 | S.22 18 43.4 | 11.233 |
| 1 | 18 57 8.78 | 2.6067 | 27 52 13.2 | 2.737 | 1 | 21 1 28.89 | 2.5282 | 22 7 24.6 | 11.392 |
| 2 | 18 59 45.22 | 2.6080 | 27 49 23.3 | 2.926 | 2 | 21 4 0.45 | 2.5240 | 21 55 56.3 | 11.550 |
| 3 | 19 2 21.74 | 2.6093 | 27 46 22.1 | 3.114 | 3 | 21 6 31.76 | 2.5198 | 21 44 18.6 | 11.707 |
| 4 | 19 4 58.34 | 2.6105 | 27 43 9.6 | 3.303 | 4 | 21 9 2.83 | 2.5157 | 21 32 31.5 | 11.862 |
| 5 | 19 7 35.00 | 2.6115 | 27 39 45.8 | 3.491 | 5 | 21 11 33.64 | 2.5113 | 21 20 35.2 | 12.015 |
| 6 | 19 10 11.72 | 2.6125 | 27 36 10.7 | 3.680 | 6 | 21 14 4.19 | 2.5070 | 21 8 29.7 | 12.167 |
| 7 | 19 12 48.49 | 2.6132 | 27 32 24.2 | 3.869 | 7 | 21 16 34.48 | 2.5027 | 20 56 15.1 | 12.317 |
| 8 | 19 15 25.30 | 2.6138 | 27 28 26.4 | 4.058 | 8 | 21 19 4.51 | 2.4985 | 20 43 51.6 | 12.465 |
| 9 | 19 18 2.14 | 2.6143 | 27 24 17.3 | 4.248 | 9 | 21 21 34.29 | 2.4942 | 20 31 19.3 | 12.612 |
| 10 | 19 20 39.01 | 2.6145 | 27 19 56.8 | 4.436 | 10 | 21 24 3.80 | 2.4897 | 20 18 38.1 | 12.758 |
| 11 | 19 23 15.89 | 2.6147 | 27 15 25.0 | 4.625 | 11 | 21 26 33.04 | 2.4852 | 20 5 48.3 | 12.902 |
| 12 | 19 25 52.77 | 2.6147 | 27 10 41.8 | 4.814 | 12 | 21 29 2.01 | 2.4807 | 19 52 49.9 | 13.044 |
| 13 | 19 28 29.65 | 2.6147 | 27 5 47.3 | 5.003 | 13 | 21 31 30.71 | 2.4762 | 19 39 43.0 | 13.184 |
| 14 | 19 31 6.52 | 2.6144 | 27 0 41.5 | 5.191 | 14 | 21 33 59.14 | 2.4717 | 19 26 27.8 | 13.323 |
| 15 | 19 33 43.37 | 2 6140 | 26 55 24.4 | 5.379 | 15 | 21 36 27.31 | 2.4672 | 19 13 4.3 | 13.460 |
| 16 | 19 36 20.19 | 2.6133 | 26 49 56.0 | 5.568 | 16 | 21 38 55 20 | 2.4625 | 18 59 32.6 | 13.595 |
| 17 | 19 38 56.96 | 2.6125 | 26 44 16.3 | 5.756 | 17 | 21 41 22.81 | 2.4580 | 18 45 52.9 | 13.728 |
| 18 | 19 41 33.69 | 2.6117 | 26 38 25.3 | 5.943 | 18 | 21 43 50.15 | 2.4533 | 18 32 5.2 | 13.860 |
| 19 | 19 44 10.36 | 2.6107 | 26 32 23.1 | 6.130 | 19 | 21 46 17.21 | 2.4488 | 18 18 9.7 | 13.989 |
| 20 | 19 46 46.97 | 2.6096 | 26 26 9.7 | 6.317 | 20 | 21 48 44.00 | 2.4442 | 18 4 6.5 | 14.117 |
| 21 | 19 49 23.51 | 2.6083 | 26 19 45.1 | 6.503 | 21 | 21 51 10.51 | 2.4397 | 17 49 55.7 | 14.243 |
| 22 | 19 51 59.97 | 2.6070 | 26 13 9.3 | 6.689 | 22 | 21 53 36.75 | 2.4350 | 17 35 37.3 | 14.367 |
| 23 | 19 54 36.34 | 2.6055 | 26 6 22.4 | 6.873 | 23 | 21 56 2.71 | 2.4304 | 17 21 11.6 | 14.489 |
| 24 | 19 57 12.62 | 2.6038 | S.25 59 24.5 | 7.056 | 24 | 21 58 28.39 | 2.4259 | S.17 6 38.6 | 14.609 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### WEDNESDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 58 28.39 | 2.4259 | S.17 6 38.6 | 14.609 |
| 1 | 22 0 53.80 | 2.4212 | 16 51 58.5 | 14.727 |
| 2 | 22 3 18.93 | 2.4165 | 16 37 11.4 | 14.844 |
| 3 | 22 5 43.79 | 2.4120 | 16 22 17.2 | 14.960 |
| 4 | 22 8 8.38 | 2.4075 | 16 7 16.2 | 15.072 |
| 5 | 22 10 32.70 | 2.4030 | 15 52 8.6 | 15.181 |
| 6 | 22 12 56.74 | 2.3985 | 15 36 54.5 | 15.289 |
| 7 | 22 15 20.51 | 2.3940 | 15 21 33.9 | 15.396 |
| 8 | 22 17 44.02 | 2.3897 | 15 6 7.0 | 15.500 |
| 9 | 22 20 7.27 | 2.3853 | 14 50 33.9 | 15.603 |
| 10 | 22 22 30.25 | 2.3808 | 14 34 54.6 | 15.708 |
| 11 | 22 24 52.97 | 2.3765 | 14 19 9.5 | 15.800 |
| 12 | 22 27 15.43 | 2.3722 | 14 3 18.6 | 15.896 |
| 13 | 22 29 37.63 | 2.3679 | 13 47 22.0 | 15.990 |
| 14 | 22 31 59.58 | 2.3636 | 13 31 19.8 | 16.083 |
| 15 | 22 34 21.27 | 2.3593 | 13 15 12.1 | 16.173 |
| 16 | 22 36 42.71 | 2.3552 | 12 58 59.1 | 16.260 |
| 17 | 22 39 3.90 | 2.3512 | 12 42 40.9 | 16.346 |
| 18 | 22 41 24.84 | 2.3470 | 12 26 17.6 | 16.430 |
| 19 | 22 43 45.54 | 2.3430 | 12 9 49.3 | 16.511 |
| 20 | 22 46 6.00 | 2.3390 | 11 53 16.3 | 16.589 |
| 21 | 22 48 26.22 | 2.3350 | 11 36 38.6 | 16.667 |
| 22 | 22 50 46.21 | 2.3312 | 11 19 56.3 | 16.742 |
| 23 | 22 53 5.97 | 2.3274 | S.11 3 9.6 | 16.814 |

#### THURSDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 22 55 25.50 | 2.3237 | S.10 46 18.6 | 16.885 |
| 1 | 22 57 44.81 | 2.3200 | 10 29 23.4 | 16.953 |
| 2 | 23 0 3.90 | 2.3162 | 10 12 24.2 | 17.020 |
| 3 | 23 2 22.76 | 2.3125 | 9 55 21.0 | 17.085 |
| 4 | 23 4 41.41 | 2.3090 | 9 38 14.0 | 17.147 |
| 5 | 23 6 59.85 | 2.3056 | 9 21 3.4 | 17.206 |
| 6 | 23 9 18.09 | 2.3021 | 9 3 49.3 | 17.263 |
| 7 | 23 11 36.12 | 2.2988 | 8 46 31.8 | 17.318 |
| 8 | 23 13 53.96 | 2.2956 | 8 29 11.1 | 17.372 |
| 9 | 23 16 11.60 | 2.2924 | 8 11 47.1 | 17.425 |
| 10 | 23 18 29.05 | 2.2892 | 7 54 20.1 | 17.473 |
| 11 | 23 20 46.31 | 2.2861 | 7 36 50.3 | 17.520 |
| 12 | 23 23 3.39 | 2.2832 | 7 19 17.7 | 17.565 |
| 13 | 23 25 20.29 | 2.2802 | 7 1 42.5 | 17.607 |
| 14 | 23 27 37.02 | 2.2773 | 6 44 4.9 | 17.648 |
| 15 | 23 29 53.57 | 2.2745 | 6 26 24.8 | 17.687 |
| 16 | 23 32 9.96 | 2.2718 | 6 8 42.5 | 17.722 |
| 17 | 23 34 26.19 | 2.2692 | 5 50 58.2 | 17.756 |
| 18 | 23 36 42.26 | 2.2665 | 5 33 11.9 | 17.787 |
| 19 | 23 38 58.17 | 2.2640 | 5 15 23.7 | 17.817 |
| 20 | 23 41 13.94 | 2.2615 | 4 57 33.9 | 17.843 |
| 21 | 23 43 29.57 | 2.2592 | 4 39 42.5 | 17.869 |
| 22 | 23 45 45.05 | 2.2569 | 4 21 49.6 | 17.893 |
| 23 | 23 48 0.40 | 2.2548 | 4 3 55.4 | 17.913 |
| 24 | 23 50 15.63 | 2.2527 | S. 3 46 0.0 | 17.932 |

#### FRIDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 50 15.63 | 2.2527 | S. 3 46 0.0 | 17.932 |
| 1 | 23 52 30.73 | 2.2507 | 3 28 3.5 | 17.948 |
| 2 | 23 54 45.71 | 2.2486 | 3 10 6.2 | 17.962 |
| 3 | 23 57 0.56 | 2.2466 | 2 52 8.0 | 17.976 |
| 4 | 23 59 15.30 | 2.2448 | 2 34 9.1 | 17.987 |
| 5 | 0 1 29.94 | 2.2432 | 2 16 9.6 | 17.995 |
| 6 | 0 3 44.48 | 2.2415 | 1 58 9.7 | 18.001 |
| 7 | 0 5 58.92 | 2.2398 | 1 40 9.5 | 18.005 |
| 8 | 0 8 13.27 | 2.2383 | 1 22 9.1 | 18.007 |
| 9 | 0 10 27.53 | 2.2370 | 1 4 8.7 | 18.006 |
| 10 | 0 12 41.71 | 2.2357 | 0 46 8.4 | 18.004 |
| 11 | 0 14 55.81 | 2.2343 | 0 28 8.2 | 18.001 |
| 12 | 0 17 9.83 | 2.2330 | S. 0 10 8.3 | 17.995 |
| 13 | 0 19 23.78 | 2.2320 | N. 0 7 51.2 | 17.986 |
| 14 | 0 21 37.67 | 2.2310 | 0 25 50.0 | 17.974 |
| 15 | 0 23 51.51 | 2.2302 | 0 43 48.1 | 17.962 |
| 16 | 0 26 5.29 | 2.2292 | 1 1 45.4 | 17.947 |
| 17 | 0 28 19.02 | 2.2283 | 1 19 41.8 | 17.931 |
| 18 | 0 30 32.70 | 2.2277 | 1 37 37.1 | 17.913 |
| 19 | 0 32 46.34 | 2.2270 | 1 55 31.2 | 17.892 |
| 20 | 0 34 59 95 | 2.2265 | 2 13 24.1 | 17.870 |
| 21 | 0 37 13.53 | 2.2260 | 2 31 15.6 | 17.846 |
| 22 | 0 39 27.08 | 2.2257 | 2 49 5.6 | 17.818 |
| 23 | 0 41 40.61 | 2.2254 | N. 3 6 53.8 | 17.789 |

#### SATURDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 0 43 54.13 | 2.2252 | N. 3 24 40.3 | 17.760 |
| 1 | 0 46 7.63 | 2.2250 | 3 42 25.0 | 17.727 |
| 2 | 0 48 21.13 | 2.2248 | 4 0 7.6 | 17.692 |
| 3 | 0 50 34.62 | 2.2248 | 4 17 48.1 | 17.657 |
| 4 | 0 52 48.11 | 2.2250 | 4 35 26.4 | 17.618 |
| 5 | 0 55 1.61 | 2.2252 | 4 53 2.3 | 17.578 |
| 6 | 0 57 15.13 | 2.2254 | 5 10 35.8 | 17.537 |
| 7 | 0 59 28.66 | 2.2257 | 5 28 6.7 | 17.493 |
| 8 | 1 1 42.21 | 2.2260 | 5 45 34.9 | 17.447 |
| 9 | 1 3 55.78 | 2.2263 | 6 3 0.3 | 17.399 |
| 10 | 1 6 9.38 | 2.2268 | 6 20 22.8 | 17.349 |
| 11 | 1 8 23.01 | 2.2275 | 6 37 42.2 | 17.297 |
| 12 | 1 10 36.08 | 2.2282 | 6 54 58.4 | 17.243 |
| 13 | 1 12 50.39 | 2.2288 | 7 12 11.4 | 17.188 |
| 14 | 1 15 4.15 | 2.2297 | 7 29 21.0 | 17.132 |
| 15 | 1 17 17.96 | 2.2307 | 7 46 27.2 | 17.074 |
| 16 | 1 19 31.83 | 2.2317 | 8 3 29.9 | 17.013 |
| 17 | 1 21 45.76 | 2.2327 | 8 20 28.8 | 16.951 |
| 18 | 1 23 59.75 | 2.2337 | 8 37 24.0 | 16.886 |
| 19 | 1 26 13.81 | 2.2348 | 8 54 15.3 | 16.822 |
| 20 | 1 28 27.94 | 2.2360 | 9 11 2.6 | 16.754 |
| 21 | 1 30 42.14 | 2.2373 | 9 27 45.8 | 16.685 |
| 22 | 1 32 56.42 | 2.2387 | 9 44 24.8 | 16.614 |
| 23 | 1 35 10.78 | 2.2400 | 10 0 59.5 | 16.542 |
| 24 | 1 37 25.23 | 2.2415 | N.10 17 29.8 | 16.467 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SUNDAY 9. | | | | | TUESDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 1 37 25.23 | 2.2415 | N.10 17 29.8 | 16.467 | 0 | 3 27 34.71 | 2.3588 | N.21 33 14.6 | 11.167 |
| 1 | 1 39 39.77 | 2.2430 | 10 33 55.6 | 16.391 | 1 | 3 29 56.32 | 2.3615 | 21 44 20.5 | 11.027 |
| 2 | 1 41 54.40 | 2.2447 | 10 50 16.7 | 16.313 | 2 | 3 32 18.09 | 2.3642 | 21 55 17.9 | 10.887 |
| 3 | 1 44 9.13 | 2.2463 | 11 6 33.2 | 16.236 | 3 | 3 34 40.03 | 2.3670 | 22 6 6.9 | 10.745 |
| 4 | 1 46 23.95 | 2.2480 | 11 22 44.9 | 16.153 | 4 | 3 37 2.13 | 2.3697 | 22 16 47.3 | 10.602 |
| 5 | 1 48 38.88 | 2.2498 | 11 38 51.6 | 16.070 | 5 | 3 39 24.39 | 2.3723 | 22 27 19.1 | 10.457 |
| 6 | 1 50 53.93 | 2.2517 | 11 54 53.3 | 15.987 | 6 | 3 41 46.80 | 2.3749 | 22 37 42.2 | 10.312 |
| 7 | 1 53 9.08 | 2.2535 | 12 10 50.0 | 15.901 | 7 | 3 44 9.38 | 2.3776 | 22 47 56.6 | 10.167 |
| 8 | 1 55 24.35 | 2.2554 | 12 26 41.4 | 15.813 | 8 | 3 46 32.11 | 2.3801 | 22 58 2.2 | 10.020 |
| 9 | 1 57 39.73 | 2.2573 | 12 42 27.5 | 15.723 | 9 | 3 48 54.98 | 2.3825 | 23 7 59.0 | 9.872 |
| 10 | 1 59 55.23 | 2.2593 | 12 58 8.2 | 15.632 | 10 | 3 51 18.01 | 2.3850 | 23 17 46.9 | 9.723 |
| 11 | 2 2 10.85 | 2.2613 | 13 13 43.4 | 15.541 | 11 | 3 53 41.18 | 2.3874 | 23 27 25.8 | 9.574 |
| 12 | 2 4 26.60 | 2.2636 | 13 29 13.1 | 15.447 | 12 | 3 56 4.50 | 2.3898 | 23 36 55.8 | 9.425 |
| 13 | 2 6 42.48 | 2.2658 | 13 44 37.1 | 15.352 | 13 | 3 58 27.96 | 2.3922 | 23 46 16.8 | 9.274 |
| 14 | 2 8 58.49 | 2.2679 | 13 59 55.3 | 15.256 | 14 | 4 0 51.56 | 2.3946 | 23 55 28.7 | 9.123 |
| 15 | 2 11 14.63 | 2.2702 | 14 15 7.7 | 15.157 | 15 | 4 3 15.31 | 2.3969 | 24 4 31.5 | 8.971 |
| 16 | 2 13 30.91 | 2.2725 | 14 30 14.2 | 15.058 | 16 | 4 5 39.19 | 2.3991 | 24 13 25.2 | 8.818 |
| 17 | 2 15 47.33 | 2.2748 | 14 45 14.6 | 14.956 | 17 | 4 8 3.20 | 2.4012 | 24 22 9.7 | 8.664 |
| 18 | 2 18 3.89 | 2.2772 | 15 0 8.9 | 14.854 | 18 | 4 10 27.33 | 2.4032 | 24 30 44.9 | 8.510 |
| 19 | 2 20 20.60 | 2.2797 | 15 14 57.1 | 14.750 | 19 | 4 12 51.59 | 2.4054 | 24 39 10.9 | 8.356 |
| 20 | 2 22 37.45 | 2.2821 | 15 29 38.9 | 14.643 | 20 | 4 15 15.97 | 2.4074 | 24 47 27.6 | 8.200 |
| 21 | 2 24 54.45 | 2.2846 | 15 44 14.3 | 14.537 | 21 | 4 17 40.48 | 2.4094 | 24 55 34.9 | 8.044 |
| 22 | 2 27 11.60 | 2.2871 | 15 58 43.3 | 14.428 | 22 | 4 20 5.10 | 2.4112 | 25 3 32.9 | 7.888 |
| 23 | 2 29 28.90 | 2.2897 | N.16 13 5.7 | 14.319 | 23 | 4 22 29.83 | 2.4131 | N.25 11 21.4 | 7.730 |
| | MONDAY 10. | | | | | WEDNESDAY 12. | | | |
| 0 | 2 31 46.36 | 2.2922 | N.16 27 21.6 | 14.209 | 0 | 4 24 54.67 | 2.4148 | N.25 19 0.5 | 7.573 |
| 1 | 2 34 3.97 | 2.2948 | 16 41 30.8 | 14.096 | 1 | 4 27 19.61 | 2.4165 | 25 26 30.2 | 7.415 |
| 2 | 2 36 21.74 | 2.2976 | 16 55 33.1 | 13.982 | 2 | 4 29 44.65 | 2.4182 | 25 33 50.3 | 7.256 |
| 3 | 2 38 39.68 | 2.3003 | 17 9 28.6 | 13.867 | 3 | 4 32 9.79 | 2.4198 | 25 41 0.9 | 7.097 |
| 4 | 2 40 57.78 | 2.3030 | 17 23 17.2 | 13.751 | 4 | 4 34 35.02 | 2.4212 | 25 48 2.0 | 6.938 |
| 5 | 2 43 16.04 | 2.3057 | 17 36 58.7 | 13.632 | 5 | 4 37 0.33 | 2.4226 | 25 54 53.5 | 6.779 |
| 6 | 2 45 34.46 | 2.3084 | 17 50 33.0 | 13.513 | 6 | 4 39 25.73 | 2.4240 | 26 1 35.3 | 6.617 |
| 7 | 2 47 53.05 | 2.3113 | 18 4 0.1 | 13.392 | 7 | 4 41 51.21 | 2.4252 | 26 8 7.5 | 6.457 |
| 8 | 2 50 11.80 | 2.3139 | 18 17 20.0 | 13.272 | 8 | 4 44 16.76 | 2.4263 | 26 14 30.1 | 6.296 |
| 9 | 2 52 30.72 | 2.3167 | 18 30 32.7 | 13.150 | 9 | 4 46 42.37 | 2.4274 | 26 20 43.0 | 6.134 |
| 10 | 2 54 49.80 | 2.3194 | 18 43 38.0 | 13.026 | 10 | 4 49 8.05 | 2.4284 | 26 26 46 2 | 5.972 |
| 11 | 2 57 9.05 | 2.3222 | 18 56 35.7 | 12.899 | 11 | 4 51 33.78 | 2.4293 | 26 32 39.7 | 5.811 |
| 12 | 2 59 28.47 | 2.3250 | 19 9 25.9 | 12.773 | 12 | 4 53 59.57 | 2.4302 | 26 38 23.5 | 5.649 |
| 13 | 3 1 48.05 | 2.3278 | 19 22 8.5 | 12.646 | 13 | 4 56 25.41 | 2.4310 | 26 43 57.6 | 5.487 |
| 14 | 3 4 7.81 | 2.3307 | 19 34 43.4 | 12.517 | 14 | 4 58 51.29 | 2.4317 | 26 49 21.9 | 5.323 |
| 15 | 3 6 27.74 | 2.3336 | 19 47 10.5 | 12.387 | 15 | 5 1 17.21 | 2.4322 | 26 54 36.4 | 5.161 |
| 16 | 3 8 47.84 | 2.3364 | 19 59 29.8 | 12.256 | 16 | 5 3 43.16 | 2.4327 | 26 59 41.2 | 4.998 |
| 17 | 3 11 8.11 | 2.3392 | 20 11 41.2 | 12.124 | 17 | 5 6 9.14 | 2.4332 | 27 4 36.2 | 4.834 |
| 18 | 3 13 28.55 | 2.3421 | 20 23 44.7 | 11.992 | 18 | 5 8 35.14 | 2.4335 | 27 9 21.3 | 4.671 |
| 19 | 3 15 49.16 | 2.3449 | 20 35 40.2 | 11.857 | 19 | 5 11 1.16 | 2.4337 | 27 13 56.7 | 4.508 |
| 20 | 3 18 9.94 | 2.3477 | 20 47 27.5 | 11.721 | 20 | 5 13 27.18 | 2.4338 | 27 18 22.3 | 4.344 |
| 21 | 3 20 30.88 | 2.3504 | 20 59 6.7 | 11.585 | 21 | 5 15 53.21 | 2.4338 | 27 22 38.0 | 4.180 |
| 22 | 3 22 51.99 | 2.3532 | 21 10 37.7 | 11.447 | 22 | 5 18 19.24 | 2.4338 | 27 26 43.9 | 4.017 |
| 23 | 3 25 13.27 | 2.3560 | 21 22 0.3 | 11.307 | 23 | 5 20 45.26 | 2.4337 | 27 30 40.0 | 3.853 |
| 24 | 3 27 34.71 | 2.3588 | N.21 33 14.6 | 11.167 | 24 | 5 23 11.28 | 2.4335 | N.27 34 26.3 | 3.690 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 5 23 11.28 | 2.4336 | N.27 34 26.3 | 3.690 |
| 1 | 5 25 37.28 | 2.4331 | 27 38 2.8 | 3.527 |
| 2 | 5 28 3.25 | 2.4326 | 27 41 29.5 | 3.363 |
| 3 | 5 30 29.19 | 2.4320 | 27 44 46.3 | 3.198 |
| 4 | 5 32 55.09 | 2.4313 | 27 47 53.3 | 3.035 |
| 5 | 5 35 20.95 | 2.4306 | 27 50 50.5 | 2.873 |
| 6 | 5 37 46.77 | 2.4298 | 27 53 38.0 | 2.710 |
| 7 | 5 40 12.53 | 2.4288 | 27 56 15.7 | 2.547 |
| 8 | 5 42 38.23 | 2.4278 | 27 58 43.6 | 2.383 |
| 9 | 5 45 3.87 | 2.4266 | 28 1 1.7 | 2.220 |
| 10 | 5 47 29.44 | 2.4254 | 28 3 10.0 | 2.057 |
| 11 | 5 49 54.92 | 2.4240 | 28 5 8.6 | 1.897 |
| 12 | 5 52 20.32 | 2.4226 | 28 6 57.6 | 1.735 |
| 13 | 5 54 45.63 | 2.4210 | 28 8 36.8 | 1.578 |
| 14 | 5 57 10.84 | 2.4194 | 28 10 6.3 | 1.418 |
| 15 | 5 59 35.96 | 2.4178 | 28 11 26.2 | 1.251 |
| 16 | 6 2 0.97 | 2.4158 | 28 12 36.4 | 1.090 |
| 17 | 6 4 25.86 | 2.4137 | 28 13 37.0 | 0.930 |
| 18 | 6 6 50.62 | 2.4117 | 28 14 28.0 | 0.770 |
| 19 | 6 9 15.26 | 2.4096 | 28 15 9.4 | 0.611 |
| 20 | 6 11 39.77 | 2.4073 | 28 15 41.3 | 0.453 |
| 21 | 6 14 4.14 | 2.4050 | 28 16 3.7 | 0.298 |
| 22 | 6 16 28.37 | 2.4026 | 28 16 16.5 | 0.135 |
| 23 | 6 18 52.45 | 2.4000 | N.28 16 19.9 | 0.022 |

### FRIDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 6 21 16.37 | 2.3973 | N.28 16 13.9 | 0.178 |
| 1 | 6 23 40.13 | 2.3946 | 28 15 58.5 | 0.335 |
| 2 | 6 26 3.72 | 2.3918 | 28 15 33.7 | 0.492 |
| 3 | 6 28 27.15 | 2.3890 | 28 14 59.5 | 0.648 |
| 4 | 6 30 50.40 | 2.3859 | 28 14 16.0 | 0.802 |
| 5 | 6 33 13.46 | 2.3828 | 28 13 23.2 | 0.957 |
| 6 | 6 35 36.34 | 2.3797 | 28 12 21.2 | 1.110 |
| 7 | 6 37 59.02 | 2.3763 | 28 11 10.0 | 1.262 |
| 8 | 6 40 21.50 | 2.3731 | 28 9 49.7 | 1.415 |
| 9 | 6 42 43.79 | 2.3698 | 28 8 20.2 | 1.567 |
| 10 | 6 45 5.87 | 2.3662 | 28 6 41.6 | 1.717 |
| 11 | 6 47 27.73 | 2.3625 | 28 4 54.0 | 1.868 |
| 12 | 6 49 49.37 | 2.3587 | 28 2 57.4 | 2.018 |
| 13 | 6 52 10.78 | 2.3549 | 28 0 51.8 | 2.167 |
| 14 | 6 54 31.96 | 2.3511 | 27 58 37.4 | 2.314 |
| 15 | 6 56 52.91 | 2.3472 | 27 56 14.1 | 2.463 |
| 16 | 6 59 13.63 | 2.3432 | 27 53 41.9 | 2.609 |
| 17 | 7 1 34.10 | 2.3391 | 27 51 1.0 | 2.754 |
| 18 | 7 3 54.32 | 2.3350 | 27 48 11.4 | 2.899 |
| 19 | 7 6 14.30 | 2.3308 | 27 45 13.1 | 3.043 |
| 20 | 7 8 34.02 | 2.3264 | 27 42 6.2 | 3.187 |
| 21 | 7 10 53.47 | 2.3220 | 27 38 50.6 | 3.331 |
| 22 | 7 13 12.66 | 2.3176 | 27 35 26.5 | 3.472 |
| 23 | 7 15 31.58 | 2.3132 | 27 31 53.9 | 3.613 |
| 24 | 7 17 50.24 | 2.3087 | N.27 28 12.9 | 3.753 |

### SATURDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 17 50.24 | 2.3087 | N.27 28 12.9 | 3.753 |
| 1 | 7 20 8.62 | 2.3040 | 27 24 23.5 | 3.892 |
| 2 | 7 22 26.72 | 2.2992 | 27 20 25.8 | 4.031 |
| 3 | 7 24 44.53 | 2.2945 | 27 16 19.8 | 4.168 |
| 4 | 7 27 2.06 | 2.2897 | 27 12 5.6 | 4.305 |
| 5 | 7 29 19.30 | 2.2849 | 27 7 43.2 | 4.441 |
| 6 | 7 31 36.25 | 2.2801 | 27 3 12.7 | 4.576 |
| 7 | 7 33 52.91 | 2.2752 | 26 58 34.1 | 4.709 |
| 8 | 7 36 9.27 | 2.2701 | 26 53 47.6 | 4.842 |
| 9 | 7 38 25.32 | 2.2650 | 26 48 53.1 | 4.974 |
| 10 | 7 40 41.07 | 2.2599 | 26 43 50.7 | 5.105 |
| 11 | 7 42 56.51 | 2.2548 | 26 38 40.5 | 5.235 |
| 12 | 7 45 11.65 | 2.2497 | 26 33 22.5 | 5.364 |
| 13 | 7 47 26.48 | 2.2445 | 26 27 56.8 | 5.492 |
| 14 | 7 49 40.99 | 2.2393 | 26 22 23.5 | 5.618 |
| 15 | 7 51 55.19 | 2.2340 | 26 16 42.6 | 5.745 |
| 16 | 7 54 9.07 | 2.2287 | 26 10 54.1 | 5.871 |
| 17 | 7 56 22.63 | 2.2234 | 26 4 58.1 | 5.996 |
| 18 | 7 58 35.88 | 2.2181 | 25 58 54.7 | 6.118 |
| 19 | 8 0 48.80 | 2.2126 | 25 52 43.9 | 6.240 |
| 20 | 8 3 1.39 | 2.2072 | 25 46 25.9 | 6.361 |
| 21 | 8 5 13.66 | 2.2018 | 25 40 0.6 | 6.482 |
| 22 | 8 7 25.60 | 2.1963 | 25 33 28.1 | 6.601 |
| 23 | 8 9 37.21 | 2.1907 | N.25 26 48.5 | 6.719 |

### SUNDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 8 11 48.49 | 2.1852 | N.25 20 1.8 | 6.837 |
| 1 | 8 13 59.44 | 2.1797 | 25 13 8.1 | 6.952 |
| 2 | 8 16 10.06 | 2.1743 | 25 6 7.5 | 7.067 |
| 3 | 8 18 20.35 | 2.1688 | 24 59 0.0 | 7.182 |
| 4 | 8 20 30.31 | 2.1632 | 24 51 45.7 | 7.295 |
| 5 | 8 22 39.93 | 2.1576 | 24 44 24.7 | 7.407 |
| 6 | 8 24 49.22 | 2.1520 | 24 36 56.9 | 7.517 |
| 7 | 8 26 58.17 | 2.1464 | 24 29 22.6 | 7.627 |
| 8 | 8 29 6.79 | 2.1409 | 24 21 41.7 | 7.737 |
| 9 | 8 31 15.08 | 2.1353 | 24 13 54.2 | 7.845 |
| 10 | 8 33 23.03 | 2.1297 | 24 6 0.3 | 7.952 |
| 11 | 8 35 30.65 | 2.1242 | 23 58 0.0 | 8.058 |
| 12 | 8 37 37.93 | 2.1186 | 23 49 53.4 | 8.163 |
| 13 | 8 39 44.87 | 2.1129 | 23 41 40.5 | 8.266 |
| 14 | 8 41 51.48 | 2.1074 | 23 33 21.5 | 8.368 |
| 15 | 8 43 57.76 | 2.1017 | 23 24 56.3 | 8.471 |
| 16 | 8 46 3.70 | 2.0962 | 23 16 25.0 | 8.572 |
| 17 | 8 48 9.31 | 2.0907 | 23 7 47.7 | 8.671 |
| 18 | 8 50 14.59 | 2.0852 | 22 59 4.5 | 8.768 |
| 19 | 8 52 19.53 | 2.0796 | 22 50 15.4 | 8.867 |
| 20 | 8 54 24.14 | 2.0742 | 22 41 20.5 | 8.964 |
| 21 | 8 56 28.43 | 2.0687 | 22 32 19.7 | 9.061 |
| 22 | 8 58 32.38 | 2.0632 | 22 23 13.2 | 9.155 |
| 23 | 9 0 36.01 | 2.0578 | 22 14 1.1 | 9.248 |
| 24 | 9 2 39.31 | 2.0523 | N.22 4 43.5 | 9.340 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | **MONDAY 17.** | | | | | **WEDNESDAY 19.** | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 2 39.31 | 2.0523 | N.22 4 43.5 | 9.340 | 0 | 10 35 31.85 | 1.8842 | N.13 8 16.4 | 12.653 |
| 1 | 9 4 42.28 | 2.0468 | 21 55 20.3 | 9.432 | 1 | 10 37 21.80 | 1.8808 | 12 55 35.8 | 12.700 |
| 2 | 9 6 44.93 | 2.0415 | 21 45 51.7 | 9.523 | 2 | 10 39 11.55 | 1.8276 | 12 42 52.4 | 12.747 |
| 3 | 9 8 47.26 | 2.0362 | 21 36 17.6 | 9.613 | 3 | 10 41 1.11 | 1.8243 | 12 30 6.2 | 12.793 |
| 4 | 9 10 49.27 | 2.0308 | 21 26 38.2 | 9.701 | 4 | 10 42 50.47 | 1.8211 | 12 17 17.3 | 12.837 |
| 5 | 9 12 50.96 | 2.0255 | 21 16 53.5 | 9.788 | 5 | 10 44 39.64 | 1.8180 | 12 4 25.8 | 12.879 |
| 6 | 9 14 52.33 | 2.0202 | 21 7 3.6 | 9.875 | 6 | 10 46 28.63 | 1.8150 | 11 51 31.8 | 12.922 |
| 7 | 9 16 53.38 | 2.0149 | 20 57 8.5 | 9.961 | 7 | 10 48 17.44 | 1.8120 | 11 38 35.2 | 12.963 |
| 8 | 9 18 54.12 | 2.0097 | 20 47 8.3 | 10.045 | 8 | 10 50 6.07 | 1.8090 | 11 25 36.0 | 13.007 |
| 9 | 9 20 54.55 | 2.0045 | 20 37 3.1 | 10.128 | 9 | 10 51 54.52 | 1.8061 | 11 12 34 4 | 13.046 |
| 10 | 9 22 54.66 | 1.9993 | 20 26 52.9 | 10.211 | 10 | 10 53 42.80 | 1.8032 | 10 59 30.5 | 13.084 |
| 11 | 9 24 54.46 | 1.9942 | 20 16 37.8 | 10.293 | 11 | 10 55 30.91 | 1.8005 | 10 46 24.3 | 13.123 |
| 12 | 9 26 53.96 | 1.9891 | 20 6 17.8 | 10.373 | 12 | 10 57 18.86 | 1.7978 | 10 33 15.7 | 13.162 |
| 13 | 9 28 53.15 | 1.9840 | 19 55 53.0 | 10.453 | 13 | 10 59 6.65 | 1.7952 | 10 20 4.9 | 13.198 |
| 14 | 9 30 52.04 | 1.9789 | 19 45 23.5 | 10.531 | 14 | 11 0 54.28 | 1.7926 | 10 6 51.9 | 13.235 |
| 15 | 9 32 50.62 | 1.9738 | 19 34 49.3 | 10.610 | 15 | 11 2 41.76 | 1.7900 | 9 53 36.7 | 13.271 |
| 16 | 9 34 48.90 | 1.9689 | 19 24 10.3 | 10.687 | 16 | 11 4 29.08 | 1.7875 | 9 40 19.4 | 13.306 |
| 17 | 9 36 46.89 | 1.9641 | 19 13 26.8 | 10.762 | 17 | 11 6 16.26 | 1.7852 | 9 27 0.1 | 13.338 |
| 18 | 9 38 44.59 | 1.9592 | 19 2 38.9 | 10.836 | 18 | 11 8 3.30 | 1.7827 | 9 13 38.8 | 13.372 |
| 19 | 9 40 41.99 | 1.9543 | 18 51 46.5 | 10.910 | 19 | 11 9 50.19 | 1.7804 | 9 0 15.5 | 13.404 |
| 20 | 9 42 39.10 | 1.9495 | 18 40 49.7 | 10.983 | 20 | 11 11 36.95 | 1.7783 | 8 46 50.3 | 13.436 |
| 21 | 9 44 35.93 | 1.9447 | 18 29 48.5 | 11.056 | 21 | 11 13 23.59 | 1.7762 | 8 33 23.2 | 13.467 |
| 22 | 9 46 32.47 | 1.9400 | 18 18 43.0 | 11.127 | 22 | 11 15 10.09 | 1.7740 | 8 19 54.3 | 13.497 |
| 23 | 9 48 28.73 | 1.9353 | N.18 7 33.3 | 11.196 | 23 | 11 16 56.47 | 1.7721 | N. 8 6 23.6 | 13.526 |
| | **TUESDAY 18.** | | | | | **THURSDAY 20.** | | | |
| 0 | 9 50 24.71 | 1.9307 | N.17 56 19.5 | 11.265 | 0 | 11 18 42.74 | 1.7701 | N. 7 52 51.2 | 13.554 |
| 1 | 9 52 20.41 | 1.9261 | 17 45 1.5 | 11.333 | 1 | 11 20 28.88 | 1.7681 | 7 39 17.1 | 13.582 |
| 2 | 9 54 15.84 | 1.9216 | 17 33 39.5 | 11.401 | 2 | 11 22 14.91 | 1.7663 | 7 25 41.4 | 13.609 |
| 3 | 9 56 11.00 | 1.9171 | 17 22 13.4 | 11.468 | 3 | 11 24 0.84 | 1.7646 | 7 12 4.0 | 13.636 |
| 4 | 9 58 5.89 | 1.9127 | 17 10 43.3 | 11.533 | 4 | 11 25 46.66 | 1.7628 | 6 58 25.1 | 13.661 |
| 5 | 10 0 0.52 | 1.9082 | 16 59 9.4 | 11.597 | 5 | 11 27 32.38 | 1.7612 | 6 44 44.7 | 13.686 |
| 6 | 10 1 54.88 | 1.9038 | 16 47 31.7 | 11.660 | 6 | 11 29 18.00 | 1.7595 | 6 31 2.8 | 13.710 |
| 7 | 10 3 48.98 | 1.8996 | 16 35 50.2 | 11.723 | 7 | 11 31 3.52 | 1.7580 | 6 17 19.5 | 13.733 |
| 8 | 10 5 42.83 | 1.8953 | 16 24 5.0 | 11.785 | 8 | 11 32 48.96 | 1.7566 | 6 3 34.9 | 13.754 |
| 9 | 10 7 36.42 | 1.8911 | 16 12 16.0 | 11.847 | 9 | 11 34 34.31 | 1.7552 | 5 49 49.0 | 13.776 |
| 10 | 10 9 29.76 | 1.8869 | 16 0 23.4 | 11.906 | 10 | 11 36 19.58 | 1.7538 | 5 36 1.8 | 13.797 |
| 11 | 10 11 22.85 | 1.8827 | 15 48 27.3 | 11.965 | 11 | 11 38 4.77 | 1.7525 | 5 22 13.4 | 13.816 |
| 12 | 10 13 15.69 | 1.8787 | 15 36 27.6 | 12.024 | 12 | 11 39 49.88 | 1.7512 | 5 8 23 9 | 13.834 |
| 13 | 10 15 8.29 | 1.8747 | 15 24 24.4 | 12.081 | 13 | 11 41 34.92 | 1.7502 | 4 54 33.3 | 13.853 |
| 14 | 10 17 0.65 | 1.8707 | 15 12 17.9 | 12.137 | 14 | 11 43 19.90 | 1.7491 | 4 40 41.6 | 13.871 |
| 15 | 10 18 52.78 | 1.8669 | 15 0 8.0 | 12.193 | 15 | 11 45 4.81 | 1.7480 | 4 26 48.8 | 13.888 |
| 16 | 10 20 44.68 | 1.8631 | 14 47 54.8 | 12.248 | 16 | 11 46 49.66 | 1.7471 | 4 12 55.0 | 13.904 |
| 17 | 10 22 36.35 | 1.8592 | 14 35 38.4 | 12.301 | 17 | 11 48 34.46 | 1.7462 | 3 59 0.3 | 13.919 |
| 18 | 10 24 27.78 | 1.8553 | 14 23 18.7 | 12.354 | 18 | 11 50 19.20 | 1.7453 | 3 45 4.7 | 13.934 |
| 19 | 10 26 18.99 | 1.8517 | 14 10 55.9 | 12.406 | 19 | 11 52 3.90 | 1.7446 | 3 31 8.2 | 13.948 |
| 20 | 10 28 9.99 | 1.8482 | 13 58 30.0 | 12.457 | 20 | 11 53 48.55 | 1.7438 | 3 17 10.9 | 13.961 |
| 21 | 10 30 0.77 | 1.8446 | 13 46 1.0 | 12.508 | 21 | 11 55 33.16 | 1.7432 | 3 3 12.9 | 13.973 |
| 22 | 10 31 51.34 | 1.8411 | 13 33 29.0 | 12.558 | 22 | 11 57 17.73 | 1.7426 | 2 49 14.1 | 13.985 |
| 23 | 10 33 41.70 | 1.8376 | 13 20 54.1 | 12.605 | 23 | 11 59 2.27 | 1.7422 | 2 35 14.7 | 13 996 |
| 24 | 10 35 31.85 | 1.8342 | N.13 8 16.4 | 12.653 | 24 | 12 0 46.79 | 1.7417 | N. 2 21 14.6 | 14.006 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 0 46.79 | 1.7417 | N. 2 21 14.6 | 14.006 |
| 1 | 12 2 31.28 | 1.7413 | 2 7 14.0 | 14.015 |
| 2 | 12 4 15.75 | 1.7410 | 1 53 12.8 | 14.024 |
| 3 | 12 6 0.20 | 1.7407 | 1 39 11.1 | 14.033 |
| 4 | 12 7 44.63 | 1.7406 | 1 25 8.9 | 14.039 |
| 5 | 12 9 29.06 | 1.7404 | 1 11 6.4 | 14.045 |
| 6 | 12 11 13.48 | 1.7403 | 0 57 3.5 | 14.051 |
| 7 | 12 12 57.90 | 1.7403 | 0 43 0.3 | 14.056 |
| 8 | 12 14 42.32 | 1.7404 | 0 28 56.9 | 14.059 |
| 9 | 12 16 26.75 | 1.7406 | 0 14 53.2 | 14.063 |
| 10 | 12 18 11.19 | 1.7408 | N. 0 0 49.3 | 14.066 |
| 11 | 12 19 55.65 | 1.7411 | S. 0 13 14.7 | 14.068 |
| 12 | 12 21 40.12 | 1.7413 | 0 27 18.8 | 14.069 |
| 13 | 12 23 24.61 | 1.7417 | 0 41 23.0 | 14.069 |
| 14 | 12 25 9.13 | 1.7422 | 0 55 27.1 | 14.068 |
| 15 | 12 26 53.68 | 1.7427 | 1 9 31.2 | 14.067 |
| 16 | 12 28 38.26 | 1.7433 | 1 23 35.2 | 14.065 |
| 17 | 12 30 22.88 | 1.7441 | 1 37 39.0 | 14.063 |
| 18 | 12 32 7.55 | 1.7448 | 1 51 42.7 | 14.060 |
| 19 | 12 33 52.26 | 1.7456 | 2 5 46.2 | 14.056 |
| 20 | 12 35 37.02 | 1.7464 | 2 19 49.3 | 14.049 |
| 21 | 12 37 21.83 | 1.7473 | 2 33 52.1 | 14.043 |
| 22 | 12 39 6.70 | 1.7483 | 2 47 54.5 | 14.037 |
| 23 | 12 40 51.63 | 1.7494 | S. 3 1 56.5 | 14.030 |

### SATURDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 12 42 36.63 | 1.7505 | S. 3 15 58.1 | 14.022 |
| 1 | 12 44 21.69 | 1.7517 | 3 29 59.1 | 14.013 |
| 2 | 12 46 6.83 | 1.7530 | 3 43 59.6 | 14.004 |
| 3 | 12 47 52.05 | 1.7542 | 3 57 59.6 | 13.994 |
| 4 | 12 49 37.34 | 1.7556 | 4 11 58.9 | 13.982 |
| 5 | 12 51 22.72 | 1.7572 | 4 25 57.4 | 13.969 |
| 6 | 12 53 8.20 | 1.7587 | 4 39 55.2 | 13.957 |
| 7 | 12 54 53.76 | 1.7602 | 4 53 52.2 | 13.943 |
| 8 | 12 56 39.42 | 1.7619 | 5 7 48.4 | 13.929 |
| 9 | 12 58 25.19 | 1.7637 | 5 21 43.7 | 13.914 |
| 10 | 13 0 11.06 | 1.7654 | 5 35 38.1 | 13.898 |
| 11 | 13 1 57.04 | 1.7672 | 5 49 31.5 | 13.882 |
| 12 | 13 3 43.12 | 1.7690 | 6 3 23.9 | 13.864 |
| 13 | 13 5 29.32 | 1.7710 | 6 17 15.2 | 13.846 |
| 14 | 13 7 15.64 | 1.7731 | 6 31 5.4 | 13.827 |
| 15 | 13 9 2.09 | 1.7752 | 6 44 54.4 | 13.807 |
| 16 | 13 10 48.67 | 1.7774 | 6 58 42.2 | 13.786 |
| 17 | 13 12 35.38 | 1.7797 | 7 12 28.7 | 13.764 |
| 18 | 13 14 22.23 | 1.7820 | 7 26 13.9 | 13.742 |
| 19 | 13 16 9.22 | 1.7843 | 7 39 57.7 | 13.718 |
| 20 | 13 17 56.35 | 1.7868 | 7 53 40.1 | 13.695 |
| 21 | 13 19 43.63 | 1.7892 | 8 7 21.1 | 13.671 |
| 22 | 13 21 31.06 | 1.7918 | 8 21 0.6 | 13.645 |
| 23 | 13 23 18.65 | 1.7945 | 8 34 38.5 | 13.618 |
| 24 | 13 25 6.40 | 1.7972 | S. 8 48 14.7 | 13.590 |

### SUNDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 25 6.40 | 1.7972 | S. 8 48 14.7 | 13.590 |
| 1 | 13 26 54.31 | 1.7999 | 9 1 49.3 | 13.562 |
| 2 | 13 28 42.39 | 1.8027 | 9 15 22.1 | 13.533 |
| 3 | 13 30 30.64 | 1.8057 | 9 28 53.2 | 13.503 |
| 4 | 13 32 19.07 | 1.8087 | 9 42 22.5 | 13.473 |
| 5 | 13 34 7.68 | 1.8117 | 9 55 49.9 | 13.441 |
| 6 | 13 35 56.47 | 1.8147 | 10 9 15.4 | 13.408 |
| 7 | 13 37 45.44 | 1.8178 | 10 22 38.9 | 13.375 |
| 8 | 13 39 34.61 | 1.8212 | 10 36 0.4 | 13.341 |
| 9 | 13 41 23.98 | 1.8244 | 10 49 19.8 | 13.306 |
| 10 | 13 43 13.54 | 1.8277 | 11 2 37.1 | 13.270 |
| 11 | 13 45 3.31 | 1.8312 | 11 15 52.2 | 13.233 |
| 12 | 13 46 53.29 | 1.8347 | 11 29 5.1 | 13.196 |
| 13 | 13 48 43.47 | 1.8382 | 11 42 15.7 | 13.157 |
| 14 | 13 50 33.87 | 1.8418 | 11 55 23.9 | 13.117 |
| 15 | 13 52 24.49 | 1.8455 | 12 8 29.8 | 13.078 |
| 16 | 13 54 15.33 | 1.8492 | 12 21 33.3 | 13.037 |
| 17 | 13 56 6.40 | 1.8530 | 12 34 34.2 | 12.993 |
| 18 | 13 57 57.69 | 1.8568 | 12 47 32.5 | 12.950 |
| 19 | 13 59 49.21 | 1.8607 | 13 0 28.2 | 12.906 |
| 20 | 14 1 40.97 | 1.8648 | 13 13 21.2 | 12.862 |
| 21 | 14 3 32.98 | 1.8688 | 13 26 11.6 | 12.817 |
| 22 | 14 5 25.23 | 1.8729 | 13 38 59.2 | 12.769 |
| 23 | 14 7 17.73 | 1.8771 | S.13 51 43.9 | 12.721 |

### MONDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 9 10.48 | 1.8812 | S.14 4 25.7 | 12.672 |
| 1 | 14 11 3.48 | 1.8855 | 14 17 4.6 | 12.623 |
| 2 | 14 12 56.74 | 1.8899 | 14 29 40.4 | 12.572 |
| 3 | 14 14 50.27 | 1.8943 | 14 42 13.2 | 12.521 |
| 4 | 14 16 44.06 | 1.8987 | 14 54 42.9 | 12.467 |
| 5 | 14 18 38.12 | 1.9033 | 15 7 9.3 | 12.413 |
| 6 | 14 20 32.46 | 1.9079 | 15 19 32.5 | 12.359 |
| 7 | 14 22 27.07 | 1.9125 | 15 31 52.4 | 12.304 |
| 8 | 14 24 21.96 | 1.9172 | 15 44 9.0 | 12.248 |
| 9 | 14 26 17.13 | 1.9219 | 15 56 22.1 | 12.189 |
| 10 | 14 28 12.59 | 1.9267 | 16 8 31.8 | 12.131 |
| 11 | 14 30 8.34 | 1.9316 | 16 20 37.8 | 12.072 |
| 12 | 14 32 4.39 | 1.9366 | 16 32 40.3 | 12.012 |
| 13 | 14 34 0.73 | 1.9415 | 16 44 39.2 | 11.950 |
| 14 | 14 35 57.37 | 1.9466 | 16 56 34.3 | 11.887 |
| 15 | 14 37 54.32 | 1.9517 | 17 8 25.6 | 11.823 |
| 16 | 14 39 51.57 | 1.9567 | 17 20 13.1 | 11.758 |
| 17 | 14 41 49.13 | 1.9620 | 17 31 56.6 | 11.692 |
| 18 | 14 43 47.01 | 1.9672 | 17 43 36.1 | 11.625 |
| 19 | 14 45 45.20 | 1.9725 | 17 55 11.6 | 11.558 |
| 20 | 14 47 43.71 | 1.9778 | 18 6 43.0 | 11.489 |
| 21 | 14 49 42.54 | 1.9832 | 18 18 10.3 | 11.420 |
| 22 | 14 51 41.70 | 1.9887 | 18 29 33.4 | 11.348 |
| 23 | 14 53 41.19 | 1.9942 | 18 40 52.1 | 11.276 |
| 24 | 14 55 41.00 | 1.9997 | S.18 52 6.5 | 11.208 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 55 41.00 | 1.9997 | S.18 52 6.5 | 11.208 |
| 1 | 14 57 41.15 | 2.0052 | 19 3 16.5 | 11.129 |
| 2 | 14 59 41.63 | 2.0109 | 19 14 22.0 | 11.053 |
| 3 | 15 1 42.46 | 2.0166 | 19 25 22.9 | 10.977 |
| 4 | 15 3 43.62 | 2.0223 | 19 36 19.2 | 10.899 |
| 5 | 15 5 45.13 | 2.0281 | 19 47 10.8 | 10.820 |
| 6 | 15 7 46.99 | 2.0339 | 19 57 57.6 | 10.740 |
| 7 | 15 9 49.20 | 2.0397 | 20 8 39.6 | 10.659 |
| 8 | 15 11 51.76 | 2.0456 | 20 19 16.7 | 10.578 |
| 9 | 15 13 54.67 | 2.0515 | 20 29 48.9 | 10.494 |
| 10 | 15 15 57.94 | 2.0575 | 20 40 16.0 | 10.409 |
| 11 | 15 18 1.57 | 2.0634 | 20 50 38.0 | 10.324 |
| 12 | 15 20 5.55 | 2.0693 | 21 0 54.9 | 10.238 |
| 13 | 15 22 9.89 | 2.0754 | 21 11 6.6 | 10.150 |
| 14 | 15 24 14.60 | 2.0817 | 21 21 12.9 | 10.060 |
| 15 | 15 26 19.69 | 2.0878 | 21 31 13.8 | 9.970 |
| 16 | 15 28 25.14 | 2.0939 | 21 41 9.3 | 9.879 |
| 17 | 15 30 30.96 | 2.1001 | 21 50 59.3 | 9.787 |
| 18 | 15 32 37.15 | 2.1062 | 22 0 43.7 | 9.693 |
| 19 | 15 34 43.71 | 2.1125 | 22 10 22.5 | 9.598 |
| 20 | 15 36 50.65 | 2.1187 | 22 19 55.5 | 9.502 |
| 21 | 15 38 57.96 | 2.1249 | 22 29 22.7 | 9.406 |
| 22 | 15 41 5.64 | 2.1312 | 22 38 44.1 | 9.307 |
| 23 | 15 43 13.70 | 2.1376 | S.22 47 59.5 | 9.207 |

### WEDNESDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 45 22.15 | 2.1439 | S.22 57 8.9 | 9.106 |
| 1 | 15 47 30.97 | 2.1502 | 23 6 12.2 | 9.004 |
| 2 | 15 49 40.17 | 2.1566 | 23 15 9.4 | 8.901 |
| 3 | 15 51 49.76 | 2.1630 | 23 24 0.3 | 8.797 |
| 4 | 15 53 59.73 | 2.1693 | 23 32 44.9 | 8.691 |
| 5 | 15 56 10.08 | 2.1757 | 23 41 23.2 | 8.584 |
| 6 | 15 58 20.82 | 2.1822 | 23 49 55.0 | 8.476 |
| 7 | 16 0 31.94 | 2.1885 | 23 58 20.3 | 8.367 |
| 8 | 16 2 43.44 | 2.1949 | 24 6 39.0 | 8.256 |
| 9 | 16 4 55.33 | 2.2013 | 24 14 51.0 | 8.144 |
| 10 | 16 7 7.60 | 2.2077 | 24 22 56.3 | 8.031 |
| 11 | 16 9 20.26 | 2.2142 | 24 30 54.7 | 7.916 |
| 12 | 16 11 33.30 | 2.2206 | 24 38 46.2 | 7.801 |
| 13 | 16 13 46.73 | 2.2270 | 24 46 30.8 | 7.684 |
| 14 | 16 16 0.54 | 2.2332 | 24 54 8.3 | 7.567 |
| 15 | 16 18 14.72 | 2.2396 | 25 1 38.8 | 7.448 |
| 16 | 16 20 29.29 | 2.2460 | 25 9 2.1 | 7.327 |
| 17 | 16 22 44.24 | 2.2522 | 25 16 18.1 | 7.205 |
| 18 | 16 24 59.56 | 2.2586 | 25 23 26.7 | 7.082 |
| 19 | 16 27 15.27 | 2.2649 | 25 30 27.9 | 6.958 |
| 20 | 16 29 31.35 | 2.2712 | 25 37 21.7 | 6.835 |
| 21 | 16 31 47.81 | 2.2775 | 25 44 8.0 | 6.708 |
| 22 | 16 34 4.65 | 2.2837 | 25 50 46.7 | 6.580 |
| 23 | 16 36 21.86 | 2.2898 | 25 57 17.6 | 6.451 |
| 24 | 16 38 39.43 | 2.2959 | S.26 3 40.8 | 6.322 |

### THURSDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 38 39.43 | 2.2959 | S.26 3 40.8 | 6.322 |
| 1 | 16 40 57.37 | 2.3021 | 26 9 56.2 | 6.190 |
| 2 | 16 43 15.68 | 2.3082 | 26 16 3.6 | 6.058 |
| 3 | 16 45 34.36 | 2.3143 | 26 22 3.1 | 5.924 |
| 4 | 16 47 53.40 | 2.3203 | 26 27 54.5 | 5.789 |
| 5 | 16 50 12.80 | 2.3263 | 26 33 37.8 | 5.654 |
| 6 | 16 52 32.56 | 2.3322 | 26 39 13.0 | 5.518 |
| 7 | 16 54 52.67 | 2.3381 | 26 44 40.0 | 5.380 |
| 8 | 16 57 13.13 | 2.3440 | 26 49 58.6 | 5.239 |
| 9 | 16 59 33.95 | 2.3499 | 26 55 8.7 | 5.098 |
| 10 | 17 1 55.12 | 2.3556 | 27 0 10.4 | 4.956 |
| 11 | 17 4 16.62 | 2.3612 | 27 5 3.6 | 4.815 |
| 12 | 17 6 38.46 | 2.3668 | 27 9 48.2 | 4.672 |
| 13 | 17 9 0.64 | 2.3723 | 27 14 24.2 | 4.527 |
| 14 | 17 11 23.14 | 2.3777 | 27 18 51.4 | 4.380 |
| 15 | 17 13 45.97 | 2.3832 | 27 23 9.8 | 4.233 |
| 16 | 17 16 9.12 | 2.3885 | 27 27 19.4 | 4.085 |
| 17 | 17 18 32.59 | 2.3938 | 27 31 20.0 | 3.935 |
| 18 | 17 20 56.38 | 2.3991 | 27 35 11.6 | 3.785 |
| 19 | 17 23 20.48 | 2.4042 | 27 38 54.2 | 3.633 |
| 20 | 17 25 44.88 | 2.4092 | 27 42 27.6 | 3.481 |
| 21 | 17 28 9.58 | 2.4142 | 27 45 51.9 | 3.328 |
| 22 | 17 30 34.58 | 2.4191 | 27 49 7.0 | 3.174 |
| 23 | 17 32 59.87 | 2.4239 | S.27 52 12.8 | 3.019 |

### FRIDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 35 25.45 | 2.4287 | S.27 55 9.3 | 2.863 |
| 1 | 17 37 51.31 | 2.4332 | 27 57 56.4 | 2.706 |
| 2 | 17 40 17.44 | 2.4378 | 28 0 34.0 | 2.548 |
| 3 | 17 42 43.85 | 2.4423 | 28 3 2.1 | 2.388 |
| 4 | 17 45 10.52 | 2.4467 | 28 5 20.6 | 2.228 |
| 5 | 17 47 37.45 | 2.4509 | 28 7 29.5 | 2.068 |
| 6 | 17 50 4.63 | 2.4551 | 28 9 28.7 | 1.906 |
| 7 | 17 52 32.06 | 2.4592 | 28 11 18.2 | 1.743 |
| 8 | 17 54 59.73 | 2.4631 | 28 12 57.9 | 1.580 |
| 9 | 17 57 27.63 | 2.4669 | 28 14 27.8 | 1.417 |
| 10 | 17 59 55.76 | 2.4706 | 28 15 47.9 | 1.252 |
| 11 | 18 2 24.12 | 2.4744 | 28 16 58.0 | 1.085 |
| 12 | 18 4 52.69 | 2.4779 | 28 17 58.1 | 0.918 |
| 13 | 18 7 21.47 | 2.4813 | 28 18 48.2 | 0.752 |
| 14 | 18 9 50.45 | 2.4847 | 28 19 28.3 | 0.584 |
| 15 | 18 12 19.63 | 2.4879 | 28 19 58.3 | 0.416 |
| 16 | 18 14 49.00 | 2.4909 | 28 20 18.2 | 0.247 |
| 17 | 18 17 18.54 | 2.4938 | 28 20 27.9 | 0.078 |
| 18 | 18 19 48.26 | 2.4967 | 28 20 27.5 | 0.093 |
| 19 | 18 22 18.15 | 2.4995 | 28 20 16.8 | 0.264 |
| 20 | 18 24 48.20 | 2.5022 | 28 19 55.8 | 0.435 |
| 21 | 18 27 18.41 | 2.5047 | 28 19 24.6 | 0.607 |
| 22 | 18 29 48.76 | 2.5070 | 28 18 43.0 | 0.780 |
| 23 | 18 32 19.25 | 2.5092 | 28 17 51.0 | 0.953 |
| 24 | 18 34 49.87 | 2.5114 | S.28 16 48.7 | 1.126 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 34 49.87 | 2.5114 | S.28 16 48.7 | 1.126 |
| 1 | 18 37 20.62 | 2.5134 | 28 15 35.9 | 1.303 |
| 2 | 18 39 51.48 | 2.5153 | 28 14 12.7 | 1.474 |
| 3 | 18 42 22.46 | 2.5172 | 28 12 39.0 | 1.648 |
| 4 | 18 44 53.54 | 2.5188 | 28 10 54.9 | 1.823 |
| 5 | 18 47 24.72 | 2.5203 | 28 9 0.3 | 1.996 |
| 6 | 18 49 55.98 | 2.5217 | 28 6 55.1 | 2.174 |
| 7 | 18 52 27.32 | 2.5230 | 28 4 39.4 | 2.350 |
| 8 | 18 54 58.74 | 2.5242 | 28 2 13.1 | 2.526 |
| 9 | 18 57 30.22 | 2.5252 | 27 59 36.3 | 2.702 |
| 10 | 19 0 1.76 | 2.5261 | 27 56 48.9 | 2.878 |
| 11 | 19 2 33.35 | 2.5269 | 27 53 50.9 | 3.055 |
| 12 | 19 5 4.99 | 2.5277 | 27 50 42.3 | 3.231 |
| 13 | 19 7 36.67 | 2.5282 | 27 47 23.2 | 3.408 |
| 14 | 19 10 8.37 | 2.5285 | 27 43 53.4 | 3.585 |
| 15 | 19 12 40.09 | 2.5287 | 27 40 13.0 | 3.762 |
| 16 | 19 15 11.82 | 2.5289 | 27 36 22.0 | 3.938 |
| 17 | 19 17 43.56 | 2.5290 | 27 32 20.4 | 4.116 |
| 18 | 19 20 15.30 | 2.5290 | 27 28 8.1 | 4.293 |
| 19 | 19 22 47.04 | 2.5288 | 27 23 45.2 | 4.469 |
| 20 | 19 25 18.76 | 2.5286 | 27 19 11.8 | 4.645 |
| 21 | 19 27 50.45 | 2.5280 | 27 14 27.8 | 4.822 |
| 22 | 19 30 22.12 | 2.5275 | 27 9 33.2 | 4.998 |
| 23 | 19 32 53.75 | 2.5268 | S.27 4 28.1 | 5.173 |

### SUNDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 35 25.34 | 2.5261 | S.26 59 12.4 | 5.350 |
| 1 | 19 37 56.88 | 2.5252 | 26 53 46.1 | 5.526 |
| 2 | 19 40 28.36 | 2.5242 | 26 48 9.3 | 5.700 |
| 3 | 19 42 59.79 | 2.5232 | 26 42 22.1 | 5.875 |
| 4 | 19 45 31.15 | 2.5220 | 26 36 24.3 | 6.050 |
| 5 | 19 48 2.43 | 2.5207 | 26 30 16.1 | 6.224 |
| 6 | 19 50 33.63 | 2.5193 | 26 23 57.4 | 6.398 |
| 7 | 19 53 4.75 | 2.5178 | 26 17 28.3 | 6.572 |
| 8 | 19 55 35.77 | 2.5163 | 26 10 48.8 | 6.745 |
| 9 | 19 58 6.69 | 2.5145 | 26 3 58.9 | 6.918 |
| 10 | 20 0 37.51 | 2.5127 | 25 56 58.7 | 7.089 |
| 11 | 20 3 8.21 | 2.5107 | 25 49 48.2 | 7.261 |
| 12 | 20 5 38.80 | 2.5086 | 25 42 27.4 | 7.432 |
| 13 | 20 8 9.27 | 2.5067 | 25 34 56.4 | 7.602 |
| 14 | 20 10 39.61 | 2.5045 | 25 27 15.2 | 7.771 |
| 15 | 20 13 9.81 | 2.5022 | 25 19 23.9 | 7.940 |
| 16 | 20 15 39.88 | 2.4999 | 25 11 22.4 | 8.108 |
| 17 | 20 18 9.80 | 2.4975 | 25 3 10.9 | 8.275 |
| 18 | 20 20 39.58 | 2.4951 | 24 54 49.4 | 8.442 |
| 19 | 20 23 9.21 | 2.4925 | 24 46 17.9 | 8.607 |
| 20 | 20 25 38.68 | 2.4897 | 24 37 36.5 | 8.773 |
| 21 | 20 28 7.98 | 2.4870 | 24 28 45.1 | 8.938 |
| 22 | 20 30 37.12 | 2.4842 | 24 19 43.9 | 9.101 |
| 23 | 20 33 6.09 | 2.4814 | 24 10 33.0 | 9.263 |
| 24 | 20 35 34.89 | 2.4785 | S.24 1 12.3 | 9.426 |

### MONDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ″ | ″ |
| 0 | 20 35 34.89 | 2.4785 | S.24 1 12.3 | 9.426 |
| 1 | 20 38 3.51 | 2.4755 | 23 51 41.9 | 9.587 |
| 2 | 20 40 31.95 | 2.4725 | 23 42 1.9 | 9.746 |
| 3 | 20 43 0.21 | 2.4694 | 23 32 12.4 | 9.905 |
| 4 | 20 45 28.28 | 2.4662 | 23 22 13.3 | 10.063 |
| 5 | 20 47 56.16 | 2.4631 | 23 12 4.8 | 10.220 |
| 6 | 20 50 23.85 | 2.4597 | 23 1 46.9 | 10.393 |
| 7 | 20 52 51.34 | 2.4565 | 22 51 19.6 | 10.532 |
| 8 | 20 55 18.63 | 2.4532 | 22 40 43.1 | 10.684 |
| 9 | 20 57 45.72 | 2.4497 | 22 29 57.5 | 10.837 |
| 10 | 21 0 12.60 | 2.4463 | 22 19 2.7 | 10.989 |
| 11 | 21 2 39.28 | 2.4429 | 22 7 58.8 | 11.140 |
| 12 | 21 5 5.75 | 2.4394 | 21 56 45.9 | 11.289 |
| 13 | 21 7 32.01 | 2.4358 | 21 45 24.1 | 11.437 |
| 14 | 21 9 58.05 | 2.4322 | 21 33 53.5 | 11.584 |
| 15 | 21 12 23.88 | 2.4287 | 21 22 14.0 | 11.731 |
| 16 | 21 14 49.49 | 2.4251 | 21 10 25.8 | 11.874 |
| 17 | 21 17 14.89 | 2.4215 | 20 58 29.1 | 12.017 |
| 18 | 21 19 40.07 | 2.4178 | 20 46 23.8 | 12.159 |
| 19 | 21 22 5.03 | 2.4142 | 20 34 10.0 | 12.299 |
| 20 | 21 24 29.77 | 2.4106 | 20 21 47.9 | 12.438 |
| 21 | 21 26 54.28 | 2.4067 | 20 9 17.4 | 12.578 |
| 22 | 21 29 18.57 | 2.4030 | 19 56 38.6 | 12.714 |
| 23 | 21 31 42.64 | 2.3993 | S.19 43 51.7 | 12.848 |

### TUESDAY, APRIL 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 21 34 6.49 | 2.3956 | S.19 30 56.8 | 12.982 |

### PHASES OF THE MOON.

| | Day. | h. m. |
|---|---|---|
| ● New Moon, . . | 6 | 8 39.3 |
| ☽ First Quarter, . | 13 | 2 36.4 |
| ○ Full Moon, . . | 21 | 4 4.7 |
| ☾ Last Quarter, . . | 29 | 2 31.7 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . . | 6 | 13.4 |
| ☾ Apogee, . . . . . | 20 | 8.6 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Mars | W. | 67 22 33 | 2509 | 69 3 34 | 2489 | 70 45 3 | 2470 | 72 26 58 | 2450 |
| | Spica | W. | 66 29 48 | 2533 | 68 10 15 | 2515 | 69 51 8 | 2495 | 71 32 28 | 2477 |
| | Antares | W. | 20 35 49 | 2534 | 22 16 15 | 2515 | 23 57 8 | 2495 | 25 38 28 | 2477 |
| | Venus | E. | 37 18 43 | 2988 | 35 48 15 | 2972 | 34 17 27 | 2956 | 32 46 18 | 2939 |
| | Sun | E. | 72 46 46 | 2876 | 71 13 56 | 2855 | 69 40 39 | 2835 | 68 6 56 | 2815 |
| 2 | Mars | W. | 81 3 25 | 2355 | 82 48 5 | 2335 | 84 33 13 | 2317 | 86 18 48 | 2298 |
| | Spica | W. | 80 5 45 | 2382 | 81 49 45 | 2364 | 83 34 12 | 2346 | 85 19 5 | 2326 |
| | Antares | W. | 34 11 50 | 2381 | 35 55 52 | 2362 | 37 40 21 | 2344 | 39 25 17 | 2324 |
| | Sun | E. | 60 11 49 | 2714 | 58 35 28 | 2695 | 56 58 41 | 2675 | 55 21 27 | 2655 |
| 3 | Mars | W. | 95 13 39 | 2206 | 97 1 58 | 2188 | 98 50 43 | 2171 | 100 39 54 | 2154 |
| | Spica | W. | 94 10 18 | 2237 | 95 57 51 | 2219 | 97 45 50 | 2202 | 99 34 14 | 2186 |
| | Antares | W. | 48 16 44 | 2234 | 50 4 21 | 2217 | 51 52 23 | 2200 | 53 40 51 | 2184 |
| | Sun | E. | 47 8 45 | 2561 | 45 28 57 | 2543 | 43 48 44 | 2526 | 42 8 7 | 2509 |
| 4 | Antares | W. | 62 49 14 | 2106 | 64 40 4 | 2093 | 66 31 15 | 2079 | 68 22 46 | 2066 |
| | Sun | E. | 33 39 18 | 2433 | 31 56 31 | 2421 | 30 13 26 | 2410 | 28 30 5 | 2400 |
| 8 | Sun | W. | 23 18 34 | 2355 | 25 3 14 | 2360 | 26 47 46 | 2367 | 28 32 8 | 2375 |
| | Aldebaran | E. | 56 23 46 | 2096 | 54 32 41 | 2110 | 52 41 57 | 2125 | 50 51 36 | 2140 |
| | Saturn | E. | 71 49 35 | 2046 | 69 57 12 | 2056 | 68 5 5 | 2067 | 66 13 15 | 2079 |
| | Pollux | E. | 99 52 52 | 2017 | 97 59 44 | 2028 | 96 6 53 | 2038 | 94 14 18 | 2060 |
| 9 | Sun | W. | 37 10 26 | 2433 | 38 53 13 | 2448 | 40 35 40 | 2462 | 42 17 46 | 2477 |
| | Aldebaran | E. | 41 46 26 | 2240 | 39 58 58 | 2264 | 38 12 6 | 2291 | 36 25 54 | 2320 |
| | Saturn | E. | 56 59 1 | 2148 | 55 9 15 | 2165 | 53 19 54 | 2180 | 51 30 57 | 2196 |
| | Pollux | E. | 84 56 0 | 2113 | 83 5 22 | 2128 | 81 15 6 | 2143 | 79 25 12 | 2158 |
| 10 | Sun | W. | 50 42 41 | 2561 | 52 22 29 | 2580 | 54 1 52 | 2598 | 55 40 50 | 2617 |
| | Saturn | E. | 42 32 53 | 2291 | 40 46 41 | 2312 | 39 0 59 | 2333 | 37 15 48 | 2356 |
| | Pollux | E | 70 21 38 | 2240 | 68 34 10 | 2256 | 66 47 8 | 2274 | 65 0 31 | 2292 |
| | Regulus | E. | 106 58 38 | 2249 | 105 11 24 | 2266 | 103 24 35 | 2283 | 101 38 11 | 2301 |
| 11 | Sun | W. | 63 49 17 | 2712 | 65 25 41 | 2732 | 67 1 39 | 2750 | 68 37 12 | 2770 |
| | α Arietis | W. | 20 30 54 | 2821 | 22 4 54 | 2779 | 23 39 49 | 2747 | 25 15 26 | 2726 |
| | Saturn | E. | 28 38 21 | 2482 | 26 56 43 | 2512 | 25 15 46 | 2544 | 23 35 34 | 2578 |
| | Pollux | E. | 56 14 0 | 2383 | 54 30 1 | 2402 | 52 46 29 | 2419 | 51 3 22 | 2438 |
| | Regulus | E. | 92 52 43 | 2391 | 91 8 55 | 2409 | 89 25 33 | 2428 | 87 42 38 | 2445 |
| 12 | Sun | W. | 76 28 35 | 2867 | 78 1 36 | 2886 | 79 34 13 | 2904 | 81 6 27 | 2922 |
| | α Arietis | W. | 33 17 49 | 2700 | 34 54 29 | 2704 | 36 31 4 | 2710 | 38 7 31 | 2716 |
| | Pollux | E. | 42 34 18 | 2529 | 40 53 45 | 2548 | 39 13 38 | 2566 | 37 33 56 | 2583 |
| | Regulus | E. | 79 14 26 | 2537 | 77 34 4 | 2554 | 75 54 6 | 2572 | 74 14 33 | 2590 |
| 13 | Sun | W. | 88 41 48 | 3014 | 90 11 44 | 3030 | 91 41 19 | 3047 | 93 10 34 | 3064 |
| | α Arietis | W. | 46 7 9 | 2763 | 47 42 25 | 2774 | 49 17 27 | 2785 | 50 52 14 | 2796 |
| | Regulus | E. | 66 2 41 | 2675 | 64 25 27 | 2690 | 62 48 34 | 2707 | 61 12 3 | 2722 |
| 14 | Sun | W. | 100 31 52 | 3141 | 101 59 12 | 3156 | 103 26 14 | 3170 | 104 52 58 | 3186 |
| | α Arietis | W. | 58 42 29 | 2854 | 60 15 47 | 2865 | 61 48 51 | 2876 | 63 21 41 | 2887 |
| | Aldebaran | W. | 28 49 6 | 3012 | 30 19 4 | 3005 | 31 49 10 | 3000 | 33 19 23 | 2998 |
| | Regulus | E. | 53 14 36 | 2798 | 51 40 5 | 2812 | 50 5 53 | 2826 | 48 31 59 | 2839 |
| | Mars | E. | 104 15 15 | 2704 | 102 38 40 | 2716 | 101 2 22 | 2729 | 99 26 20 | 2741 |
| | Spica | E. | 107 14 44 | 2786 | 105 39 58 | 2798 | 104 5 28 | 2811 | 102 31 15 | 2826 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Mars | W. | 74 9 21 | 2431 | 75 52 11 | 2412 | 77 35 28 | 2393 | 79 19 13 | 2374 |
| | Spica | W. | 73 14 14 | 2458 | 74 56 27 | 2439 | 76 39 6 | 2420 | 78 22 12 | 2401 |
| | Antares | W. | 27 20 14 | 2458 | 29 2 27 | 2438 | 30 45 7 | 2419 | 32 28 15 | 2400 |
| | Venus | E. | 31 14 49 | 2924 | 29 43 1 | 2909 | 28 10 54 | 2896 | 26 38 30 | 2884 |
| | Sun | E. | 66 32 47 | 2795 | 64 58 12 | 2775 | 63 23 11 | 2754 | 61 47 43 | 2735 |
| 2 | Mars | W. | 88 4 51 | 2279 | 89 51 22 | 2260 | 91 38 21 | 2241 | 93 25 47 | 2224 |
| | Spica | W. | 87 4 26 | 2308 | 88 50 14 | 2289 | 90 36 29 | 2271 | 92 23 11 | 2254 |
| | Antares | W. | 41 10 41 | 2306 | 42 56 32 | 2287 | 44 42 50 | 2270 | 46 29 34 | 2252 |
| | Sun | E. | 53 43 47 | 2636 | 52 5 41 | 2616 | 50 27 8 | 2597 | 48 48 9 | 2580 |
| 3 | Mars | W. | 102 29 31 | 2137 | 104 19 34 | 2121 | 106 10 1 | 2106 | 108 0 51 | 2091 |
| | Spica | W. | 101 23 2 | 2170 | 103 12 15 | 2154 | 105 1 52 | 2138 | 106 51 53 | 2124 |
| | Antares | W. | 55 29 43 | 2167 | 57 19 0 | 2151 | 59 8 41 | 2136 | 60 58 46 | 2120 |
| | Sun | E. | 40 27 6 | 2492 | 38 45 42 | 2476 | 37 3 55 | 2460 | 35 21 46 | 2447 |
| 4 | Antares | W. | 70 14 37 | 2054 | 72 6 47 | 2043 | 73 59 15 | 2032 | 75 52 0 | 2021 |
| | Sun | E. | 26 46 30 | 2392 | 25 2 44 | 2384 | 23 18 47 | 2378 | 21 34 40 | 2371 |
| 8 | Sun | W. | 30 16 18 | 2384 | 32 0 15 | 2396 | 33 43 56 | 2408 | 35 27 20 | 2420 |
| | Aldebaran | E. | 49 1 38 | 2157 | 47 12 6 | 2176 | 45 23 2 | 2196 | 43 34 28 | 2217 |
| | Saturn | E. | 64 21 44 | 2092 | 62 30 32 | 2105 | 60 39 40 | 2118 | 58 49 9 | 2134 |
| | Pollux | E. | 92 22 1 | 2061 | 90 30 2 | 2073 | 88 38 21 | 2086 | 86 47 0 | 2099 |
| 9 | Sun | W. | 43 59 31 | 2493 | 45 40 54 | 2510 | 47 21 53 | 2527 | 49 2 29 | 2544 |
| | Aldebaran | E. | 34 40 23 | 2351 | 32 55 38 | 2387 | 31 11 44 | 2425 | 29 28 45 | 2467 |
| | Saturn | E. | 49 42 26 | 2215 | 47 54 21 | 2234 | 46 6 44 | 2252 | 44 19 34 | 2272 |
| | Pollux | E. | 77 35 41 | 2174 | 75 46 34 | 2190 | 73 57 51 | 2206 | 72 9 32 | 2223 |
| 10 | Sun | W. | 57 19 22 | 2635 | 58 57 29 | 2654 | 60 35 11 | 2673 | 62 12 27 | 2692 |
| | Saturn | E. | 35 31 10 | 2379 | 33 47 5 | 2403 | 32 3 34 | 2428 | 30 20 39 | 2454 |
| | Pollux | E | 63 14 20 | 2311 | 61 28 36 | 2328 | 59 43 18 | 2346 | 57 58 26 | 2364 |
| | Regulus | E. | 99 52 13 | 2319 | 98 6 41 | 2337 | 96 21 35 | 2355 | 94 36 56 | 2373 |
| 11 | Sun | W. | 70 12 19 | 2789 | 71 47 1 | 2808 | 73 21 18 | 2828 | 74 55 9 | 2848 |
| | α Arietis | W. | 26 51 30 | 2713 | 28 27 53 | 2705 | 30 4 26 | 2700 | 31 41 6 | 2698 |
| | Saturn | E. | 21 56 9 | 2618 | 20 17 39 | 2665 | 18 40 12 | 2719 | 17 3 57 | 2779 |
| | Pollux | E. | 49 20 42 | 2457 | 47 38 28 | 2475 | 45 56 39 | 2493 | 44 15 16 | 2511 |
| | Regulus | E. | 86 0 8 | 2464 | 84 18 4 | 2482 | 82 36 26 | 2500 | 80 55 13 | 2519 |
| 12 | Sun | W. | 82 38 18 | 2941 | 84 9 45 | 2959 | 85 40 49 | 2977 | 87 11 30 | 2996 |
| | α Arietis | W. | 39 43 49 | 2723 | 41 19 58 | 2732 | 42 55 55 | 2742 | 44 31 39 | 2753 |
| | Pollux | E. | 35 54 37 | 2599 | 34 15 41 | 2617 | 32 37 9 | 2635 | 30 59 1 | 2652 |
| | Regulus | E. | 72 35 24 | 2607 | 70 56 39 | 2624 | 69 18 17 | 2641 | 67 40 18 | 2657 |
| 13 | Sun | W. | 94 39 28 | 3080 | 96 8 2 | 3096 | 97 36 17 | 3110 | 99 4 14 | 3126 |
| | α Arietis | W. | 52 26 47 | 2808 | 54 1 5 | 2819 | 55 35 8 | 2831 | 57 8 56 | 2842 |
| | Regulus | E. | 59 35 53 | 2738 | 58 0 4 | 2753 | 56 24 35 | 2769 | 54 49 26 | 2783 |
| 14 | Sun | W. | 106 19 25 | 3198 | 107 45 37 | 3210 | 109 11 34 | 3223 | 110 37 16 | 3236 |
| | α Arietis | W. | 64 54 17 | 2898 | 66 26 39 | 2909 | 67 58 47 | 2919 | 69 30 42 | 2928 |
| | Aldebaran | W. | 34 49 38 | 2997 | 36 19 54 | 2997 | 37 50 10 | 2999 | 39 20 24 | 3001 |
| | Regulus | E. | 46 58 22 | 2853 | 45 25 3 | 2866 | 43 52 1 | 2879 | 42 19 15 | 2892 |
| | Mars | E. | 97 50 34 | 2752 | 96 15 3 | 2763 | 94 39 47 | 2775 | 93 4 46 | 2785 |
| | Spica | E. | 100 57 19 | 2838 | 99 23 40 | 2849 | 97 50 16 | 2861 | 96 17 7 | 2873 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 15 | Sun | W. | 112 2 43 | 3247 | 113 27 56 | 3259 | 114 52 55 | 3270 | 116 17 41 | 3282 |
| | α Arietis | W. | 71 2 25 | 2939 | 72 33 54 | 2949 | 74 5 11 | 2958 | 75 36 16 | 2968 |
| | Aldebaran | W. | 40 50 35 | 3005 | 42 20 42 | 3008 | 43 50 45 | 3012 | 45 20 43 | 3017 |
| | Saturn | W. | 24 31 23 | 3001 | 26 1 34 | 3003 | 27 31 43 | 3004 | 29 1 51 | 3005 |
| | Regulus | E. | 40 46 46 | 2905 | 39 4 33 | 2917 | 37 42 36 | 2929 | 36 10 54 | 2942 |
| | Mars | E. | 91 29 59 | 2796 | 89 55 26 | 2806 | 88 21 6 | 2815 | 86 46 58 | 2825 |
| | Spica | E. | 94 44 13 | 2883 | 93 11 33 | 2894 | 91 39 7 | 2905 | 90 6 54 | 2915 |
| 16 | α Arietis | W. | 83 8 55 | 3009 | 84 38 56 | 3018 | 86 8 47 | 3025 | 87 38 29 | 3032 |
| | Aldebaran | W. | 52 49 7 | 3040 | 54 18 30 | 3045 | 55 47 47 | 3049 | 57 16 59 | 3054 |
| | Saturn | W. | 36 31 42 | 3025 | 38 1 24 | 3029 | 39 31 1 | 3033 | 41 0 33 | 3036 |
| | Regulus | E. | 28 36 15 | 3003 | 27 6 6 | 3016 | 25 36 13 | 3030 | 24 6 37 | 3044 |
| | Mars | E. | 78 59 11 | 2866 | 77 26 9 | 2873 | 75 53 16 | 2881 | 74 20 33 | 2887 |
| | Spica | E. | 82 28 51 | 2960 | 80 57 48 | 2968 | 79 26 55 | 2975 | 77 56 11 | 2982 |
| 17 | α Arietis | W. | 95 4 52 | 3065 | 96 33 45 | 3069 | 98 2 32 | 3075 | 99 31 12 | 3081 |
| | Aldebaran | W. | 64 41 31 | 3076 | 66 10 10 | 3080 | 67 38 44 | 3084 | 69 7 13 | 3087 |
| | Saturn | W. | 48 26 46 | 3060 | 49 55 45 | 3064 | 51 24 38 | 3069 | 52 53 26 | 3072 |
| | Pollux | W. | 20 26 14 | 3022 | 21 56 0 | 3026 | 23 25 41 | 3030 | 24 55 17 | 3034 |
| | Mars | E. | 66 38 57 | 2916 | 65 6 59 | 2921 | 63 35 7 | 2926 | 62 3 21 | 2930 |
| | Spica | E. | 70 24 42 | 3015 | 68 54 48 | 3020 | 67 25 0 | 3026 | 65 55 19 | 3030 |
| 18 | Aldebaran | W. | 76 28 38 | 3103 | 77 56 44 | 3105 | 79 24 47 | 3108 | 80 52 47 | 3110 |
| | Saturn | W. | 60 16 25 | 3087 | 61 44 50 | 3090 | 63 13 12 | 3092 | 64 41 31 | 3095 |
| | Pollux | W. | 32 22 8 | 3051 | 33 51 18 | 3053 | 35 20 25 | 3056 | 36 49 28 | 3059 |
| | Mars | E. | 54 25 47 | 2948 | 52 54 29 | 2951 | 51 23 15 | 2954 | 49 52 5 | 2956 |
| | Spica | E. | 58 28 16 | 3051 | 56 59 6 | 3054 | 55 29 59 | 3057 | 54 0 58 | 3060 |
| | Antares | E. | 104 20 38 | 3046 | 102 51 22 | 3050 | 101 22 11 | 3053 | 99 53 4 | 3056 |
| 19 | Aldebaran | W. | 88 12 10 | 3119 | 89 39 56 | 3120 | 91 7 41 | 3122 | 92 35 24 | 3123 |
| | Saturn | W. | 72 2 28 | 3103 | 73 30 34 | 3105 | 74 58 38 | 3105 | 76 26 41 | 3106 |
| | Pollux | W. | 44 14 5 | 3068 | 45 42 54 | 3069 | 47 11 41 | 3070 | 48 40 27 | 3071 |
| | Mars | E. | 42 16 53 | 2965 | 40 45 57 | 2967 | 39 15 3 | 2969 | 37 44 11 | 2970 |
| | Spica | E. | 46 36 37 | 3071 | 45 7 53 | 3073 | 43 39 11 | 3075 | 42 10 31 | 3076 |
| | Antares | E. | 92 28 11 | 3065 | 90 59 19 | 3067 | 89 30 29 | 3068 | 88 1 40 | 3069 |
| 20 | Aldebaran | W. | 99 53 42 | 3127 | 101 21 19 | 3127 | 102 48 56 | 3128 | 104 16 32 | 3128 |
| | Saturn | W. | 83 46 46 | 3108 | 85 14 46 | 3108 | 86 42 46 | 3107 | 88 10 47 | 3107 |
| | Pollux | W. | 56 4 7 | 3073 | 57 32 50 | 3072 | 59 1 34 | 3072 | 60 30 18 | 3071 |
| | Regulus | W. | 19 45 50 | 3153 | 21 12 55 | 3144 | 22 40 11 | 3135 | 24 7 38 | 3126 |
| | Spica | E. | 34 47 32 | 3082 | 33 19 0 | 3082 | 31 50 29 | 3082 | 30 21 58 | 3083 |
| | Antares | E. | 80 37 51 | 3071 | 79 9 6 | 3071 | 77 40 21 | 3071 | 76 11 36 | 3070 |
| 21 | Saturn | W. | 95 31 2 | 3103 | 96 59 8 | 3101 | 98 27 17 | 3100 | 99 55 27 | 3098 |
| | Pollux | W. | 67 54 13 | 3066 | 69 23 4 | 3065 | 70 51 57 | 3063 | 72 20 52 | 3061 |
| | Regulus | W. | 31 26 51 | 3101 | 32 55 0 | 3096 | 34 23 14 | 3092 | 35 51 33 | 3088 |
| | Antares | E. | 68 47 35 | 3065 | 67 18 43 | 3064 | 65 49 49 | 3062 | 64 20 53 | 3060 |
| 22 | Saturn | W. | 107 16 47 | 3089 | 108 45 10 | 3087 | 110 13 36 | 3084 | 111 42 5 | 3081 |
| | Pollux | W. | 79 46 4 | 3050 | 81 15 15 | 3047 | 82 44 30 | 3044 | 84 13 48 | 3041 |
| | Regulus | W. | 43 14 20 | 3069 | 44 43 7 | 3066 | 46 11 58 | 3062 | 47 40 54 | 3056 |
| | Antares | E. | 56 55 37 | 3049 | 55 26 25 | 3047 | 53 57 10 | 3043 | 52 27 51 | 3041 |
| 23 | Pollux | W. | 91 41 21 | 3023 | 93 11 5 | 3019 | 94 40 54 | 3015 | 96 10 48 | 3011 |
| | Regulus | W. | 55 6 50 | 3037 | 56 36 17 | 3032 | 58 5 50 | 3027 | 59 35 29 | 3022 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 15 | Sun | W. | 117 42 14 | 3298 | 119 6 34 | 3303 | 120 30 42 | 3313 | 121 54 39 | 3322 |
| | *a* Arietis | W. | 77 7 9 | 2977 | 78 37 51 | 2985 | 80 8 23 | 2993 | 81 38 44 | 3001 |
| | Aldebaran | W. | 46 50 35 | 3021 | 48 20 22 | 3026 | 49 50 3 | 3030 | 51 19 38 | 3035 |
| | Saturn | W. | 30 31 57 | 3007 | 32 2 1 | 3011 | 33 32 0 | 3015 | 35 1 54 | 3020 |
| | Regulus | E. | 34 39 28 | 2964 | 33 8 17 | 2965 | 31 37 21 | 2977 | 30 6 40 | 2990 |
| | Mars | E. | 85 13 2 | 2834 | 83 39 18 | 2842 | 82 5 45 | 2851 | 80 32 23 | 2859 |
| | Spica | E. | 88 34 54 | 2924 | 87 3 6 | 2934 | 85 31 30 | 2942 | 84 0 5 | 2951 |
| 16 | *a* Arietis | W. | 89 8 2 | 3039 | 90 37 27 | 3046 | 92 6 43 | 3052 | 93 35 51 | 3058 |
| | Aldebaran | W. | 58 46 5 | 3059 | 60 15 5 | 3064 | 61 43 59 | 3069 | 63 12 47 | 3072 |
| | Saturn | W. | 42 29 59 | 3043 | 43 59 19 | 3047 | 45 28 33 | 3052 | 46 57 42 | 3056 |
| | Regulus | E. | 22 37 19 | 3060 | 21 8 20 | 3078 | 19 39 43 | 3097 | 18 11 30 | 3120 |
| | Mars | E. | 72 47 58 | 2894 | 71 15 32 | 2900 | 69 43 13 | 2906 | 68 11 2 | 2911 |
| | Spica | E. | 76 25 36 | 2989 | 74 55 10 | 2996 | 73 24 53 | 3003 | 71 54 44 | 3009 |
| 17 | *a* Arietis | W. | 100 59 45 | 3086 | 102 28 12 | 3091 | 103 56 33 | 3096 | 105 24 48 | 3100 |
| | Aldebaran | W. | 70 35 38 | 3091 | 72 3 58 | 3094 | 73 32 15 | 3097 | 75 0 28 | 3100 |
| | Saturn | W. | 54 22 10 | 3076 | 55 50 49 | 3078 | 57 19 25 | 3082 | 58 47 57 | 3085 |
| | Pollux | W. | 26 24 48 | 3038 | 27 54 14 | 3041 | 29 23 36 | 3044 | 30 52 54 | 3047 |
| | Mars | E. | 60 31 40 | 2935 | 59 0 5 | 2939 | 57 28 35 | 2942 | 55 57 9 | 2945 |
| | Spica | E. | 64 25 43 | 3034 | 62 56 13 | 3039 | 61 26 49 | 3043 | 59 57 30 | 3047 |
| 18 | Aldebaran | W. | 82 20 44 | 3112 | 83 48 39 | 3114 | 85 16 31 | 3115 | 86 44 22 | 3117 |
| | Saturn | W. | 66 9 47 | 3097 | 67 38 0 | 3099 | 69 6 12 | 3101 | 70 34 21 | 3102 |
| | Pollux | W. | 38 18 28 | 3060 | 39 47 26 | 3063 | 41 16 21 | 3065 | 42 45 14 | 3066 |
| | Mars | E. | 48 20 57 | 2958 | 46 49 52 | 2961 | 45 18 50 | 2963 | 43 47 51 | 2964 |
| | Spica | E. | 52 32 0 | 3063 | 51 3 5 | 3065 | 49 34 13 | 3068 | 48 5 24 | 3069 |
| | Antares | E. | 98 24 0 | 3058 | 96 54 59 | 3060 | 95 26 1 | 3062 | 93 57 5 | 3064 |
| 19 | Aldebaran | W. | 94 3 6 | 3124 | 95 30 47 | 3125 | 96 58 26 | 3126 | 98 26 4 | 3126 |
| | Saturn | W. | 77 54 43 | 3107 | 79 22 44 | 3107 | 80 50 45 | 3107 | 82 18 46 | 3108 |
| | Pollux | W. | 50 9 12 | 3072 | 51 37 56 | 3072 | 53 6 40 | 3072 | 54 35 24 | 3073 |
| | Mars | E. | 36 13 20 | 2971 | 34 42 31 | 2972 | 33 11 42 | 2973 | 31 40 56 | 2973 |
| | Spica | E. | 40 41 52 | 3078 | 39 13 15 | 3079 | 37 44 40 | 3080 | 36 16 6 | 3080 |
| | Antares | E. | 86 32 53 | 3070 | 85 4 7 | 3070 | 83 35 21 | 3071 | 82 6 36 | 3071 |
| 20 | Aldebaran | W. | 105 44 8 | 3128 | 107 11 44 | 3129 | 108 39 19 | 3128 | 110 6 55 | 3128 |
| | Saturn | W. | 89 38 48 | 3106 | 91 6 50 | 3105 | 92 34 53 | 3105 | 94 2 57 | 3104 |
| | Pollux | W. | 61 59 3 | 3070 | 63 27 49 | 3069 | 64 56 36 | 3069 | 66 25 24 | 3068 |
| | Regulus | W. | 25 35 14 | 3121 | 27 2 58 | 3114 | 28 30 50 | 3110 | 29 58 48 | 3105 |
| | Spica | E. | 28 53 28 | 3084 | 27 24 59 | 3085 | 25 56 31 | 3087 | 24 28 5 | 3087 |
| | Antares | E. | 74 42 50 | 3069 | 73 14 3 | 3069 | 71 45 15 | 3068 | 70 16 26 | 3066 |
| 21 | Saturn | W. | 101 23 39 | 3096 | 102 51 53 | 3095 | 104 20 9 | 3093 | 105 48 27 | 3091 |
| | Pollux | W. | 73 49 49 | 3059 | 75 18 49 | 3057 | 76 47 51 | 3055 | 78 16 56 | 3052 |
| | Regulus | W. | 37 19 57 | 3084 | 38 48 26 | 3081 | 40 16 59 | 3077 | 41 45 37 | 3073 |
| | Antares | E. | 62 51 55 | 3059 | 61 22 55 | 3057 | 59 53 52 | 3054 | 58 24 46 | 3052 |
| 22 | Saturn | W. | 113 10 38 | 3079 | 114 39 13 | 3076 | 116 7 52 | 3073 | 117 36 34 | 3070 |
| | Pollux | W. | 85 43 10 | 3038 | 87 12 36 | 3034 | 88 42 7 | 3030 | 90 11 42 | 3027 |
| | Regulus | W. | 49 9 55 | 3054 | 50 39 1 | 3050 | 52 8 12 | 3046 | 53 37 28 | 3041 |
| | Antares | E. | 50 58 29 | 3038 | 49 29 3 | 3034 | 47 59 33 | 3030 | 46 29 58 | 3026 |
| 23 | Pollux | W. | 97 40 47 | 3006 | 99 10 52 | 3001 | 100 41 4 | 2996 | 102 11 22 | 2991 |
| | Regulus | W. | 61 5 14 | 3018 | 62 35 5 | 3013 | 64 5 2 | 3008 | 65 35 5 | 3001 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 23 | Antares | E. | 45 0 18 | 3023 | 43 30 34 | 3019 | 42 0 45 | 3015 | 40 30 51 | 3010 |
| | α Aquilæ | E. | 95 51 18 | 3873 | 94 37 30 | 3864 | 93 23 34 | 3858 | 92 9 32 | 3853 |
| 24 | Pollux | W. | 103 41 46 | 2985 | 105 12 17 | 2980 | 106 42 55 | 2974 | 108 13 40 | 2968 |
| | Regulus | W. | 67 5 16 | 2996 | 68 35 34 | 2990 | 70 5 59 | 2984 | 71 36 32 | 2977 |
| | Antares | E. | 32 59 54 | 2986 | 31 29 24 | 2981 | 29 58 47 | 2975 | 28 28 3 | 2970 |
| | α Aquilæ | E. | 85 58 3 | 3833 | 84 43 35 | 3832 | 83 29 6 | 3831 | 82 14 36 | 3832 |
| 25 | Regulus | W. | 79 11 19 | 2943 | 80 42 43 | 2936 | 82 14 16 | 2928 | 83 45 59 | 2920 |
| | Mars | W. | 31 23 52 | 2823 | 32 57 50 | 2815 | 34 31 59 | 2806 | 36 6 19 | 2797 |
| | Spica | W. | 25 8 37 | 2951 | 26 39 51 | 2942 | 28 11 17 | 2932 | 29 42 55 | 2923 |
| | α Aquilæ | E. | 76 2 29 | 3846 | 74 48 14 | 3853 | 73 34 6 | 3859 | 72 20 5 | 3868 |
| | Venus | E. | 107 35 34 | 3395 | 106 13 12 | 3387 | 104 50 41 | 3378 | 103 27 59 | 3369 |
| 26 | Regulus | W. | 91 27 16 | 2876 | 93 0 5 | 2866 | 94 33 7 | 2857 | 96 6 21 | 2847 |
| | Mars | W. | 44 0 58 | 2751 | 45 36 30 | 2741 | 47 12 16 | 2732 | 48 48 15 | 2720 |
| | Spica | W. | 37 24 4 | 2875 | 38 56 55 | 2865 | 40 29 59 | 2855 | 42 3 16 | 2845 |
| | α Aquilæ | E. | 66 12 37 | 3931 | 64 59 49 | 3950 | 63 47 20 | 3970 | 62 35 11 | 3992 |
| | Fomalhaut | E. | 91 18 6 | 3057 | 89 49 3 | 3048 | 88 19 50 | 3039 | 86 50 25 | 3029 |
| | Venus | E. | 96 31 48 | 3319 | 95 7 59 | 3309 | 93 43 58 | 3298 | 92 19 44 | 3287 |
| | Sun | E. | 126 42 18 | 3229 | 125 16 43 | 3218 | 123 50 55 | 3207 | 122 24 54 | 3197 |
| 27 | Mars | W. | 56 51 46 | 2665 | 58 29 13 | 2653 | 60 6 56 | 2640 | 61 44 56 | 2628 |
| | Spica | W. | 49 53 12 | 2787 | 51 27 57 | 2775 | 53 2 57 | 2763 | 54 38 13 | 2761 |
| | α Aquilæ | E. | 56 40 51 | 4149 | 55 31 36 | 4191 | 54 23 1 | 4238 | 53 15 10 | 4289 |
| | Fomalhaut | E. | 79 20 23 | 2981 | 77 49 47 | 2973 | 76 19 0 | 2963 | 74 48 1 | 2954 |
| | Venus | E. | 85 15 10 | 3225 | 83 49 31 | 3213 | 82 23 37 | 3199 | 80 57 27 | 3185 |
| | Sun | E. | 115 11 27 | 3136 | 113 44 1 | 3124 | 112 16 20 | 3110 | 110 48 23 | 3096 |
| 28 | Mars | W. | 69 59 14 | 2563 | 71 39 0 | 2549 | 73 19 5 | 2535 | 74 59 30 | 2521 |
| | Spica | W. | 62 38 47 | 2684 | 64 15 48 | 2671 | 65 53 7 | 2657 | 67 30 45 | 2642 |
| | Antares | W. | 16 44 47 | 2687 | 18 21 44 | 2672 | 19 59 2 | 2657 | 21 36 40 | 2642 |
| | Fomalhaut | E. | 67 10 15 | 2910 | 65 38 9 | 2902 | 64 5 53 | 2895 | 62 33 28 | 2888 |
| | Venus | E. | 73 42 25 | 3114 | 72 14 32 | 3097 | 70 46 19 | 3082 | 69 17 48 | 3066 |
| | Sun | E. | 103 24 23 | 3023 | 101 54 42 | 3010 | 100 24 42 | 2995 | 98 54 23 | 2979 |
| 29 | Mars | W. | 83 26 35 | 2447 | 85 9 3 | 2431 | 86 51 54 | 2416 | 88 35 6 | 2400 |
| | Spica | W. | 75 43 56 | 2566 | 77 23 37 | 2551 | 79 3 39 | 2535 | 80 44 3 | 2520 |
| | Antares | W. | 29 49 56 | 2565 | 31 29 39 | 2550 | 33 9 43 | 2534 | 34 50 9 | 2517 |
| | Fomalhaut | E. | 54 49 22 | 2862 | 53 16 15 | 2861 | 51 43 6 | 2859 | 50 9 55 | 2860 |
| | Venus | E. | 61 50 14 | 2984 | 60 19 41 | 2967 | 58 48 47 | 2950 | 57 17 31 | 2932 |
| | Sun | E. | 91 17 48 | 2898 | 89 45 27 | 2880 | 88 12 43 | 2864 | 86 39 38 | 2847 |
| 30 | Mars | W. | 97 16 45 | 2320 | 99 2 15 | 2304 | 100 48 9 | 2287 | 102 34 27 | 2272 |
| | Spica | W. | 89 11 41 | 2438 | 90 54 21 | 2422 | 92 37 25 | 2405 | 94 20 52 | 2389 |
| | Antares | W. | 43 18 0 | 2436 | 45 0 44 | 2419 | 46 43 51 | 2403 | 48 27 22 | 2386 |
| | Fomalhaut | E. | 42 25 1 | 2896 | 40 52 37 | 2912 | 39 20 34 | 2933 | 37 48 57 | 2959 |
| | Venus | E. | 49 35 37 | 2845 | 48 2 7 | 2826 | 46 28 13 | 2808 | 44 53 55 | 2789 |
| | Sun | E. | 78 48 36 | 2760 | 77 13 14 | 2741 | 75 37 29 | 2723 | 74 1 20 | 2706 |
| 31 | Spica | W. | 103 4 6 | 2307 | 104 49 56 | 2290 | 106 36 10 | 2274 | 108 22 47 | 2258 |
| | Antares | W. | 57 10 55 | 2304 | 58 56 49 | 2287 | 60 43 7 | 2271 | 62 29 49 | 2256 |
| | Venus | E. | 36 56 36 | 2701 | 35 19 58 | 2685 | 33 42 58 | 2668 | 32 5 35 | 2652 |
| | Sun | E. | 65 54 37 | 2617 | 64 16 5 | 2599 | 62 37 9 | 2582 | 60 57 49 | 2565 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 23 | Antares | E. | 39 0 51 | 3006 | 37 30 46 | 3001 | 36 0 35 | 2997 | 34 30 18 | 2991 |
| | a Aquilæ | E. | 90 55 24 | 3847 | 89 41 10 | 3842 | 88 26 51 | 3839 | 87 12 29 | 3836 |
| 24 | Pollux | W. | 109 44 33 | 2962 | 111 15 34 | 2955 | 112 46 43 | 2948 | 114 18 1 | 2942 |
| | Regulus | W. | 73 7 13 | 2971 | 74 38 2 | 2966 | 76 8 59 | 2958 | 77 40 4 | 2950 |
| | Antares | E. | 26 57 13 | 2964 | 25 26 15 | 2957 | 23 55 8 | 2950 | 22 23 52 | 2944 |
| | a Aquilæ | E. | 81 0 7 | 3833 | 79 45 39 | 3835 | 78 31 12 | 3838 | 77 16 49 | 3841 |
| 25 | Regulus | W. | 85 17 53 | 2912 | 86 49 57 | 2903 | 88 22 12 | 2894 | 89 54 38 | 2885 |
| | Mars | W. | 37 40 51 | 2788 | 39 15 34 | 2779 | 40 50 30 | 2769 | 42 25 38 | 2760 |
| | Spica | W. | 31 14 45 | 2914 | 32 46 46 | 2904 | 34 19 0 | 2894 | 35 51 26 | 2885 |
| | a Aquilæ | E. | 71 6 13 | 3878 | 69 52 31 | 3887 | 68 38 59 | 3902 | 67 25 41 | 3916 |
| | Venus | E. | 102 5 7 | 3359 | 100 42 4 | 3350 | 99 18 50 | 3340 | 97 55 25 | 3330 |
| 26 | Regulus | W. | 97 39 48 | 2837 | 99 13 28 | 2826 | 100 47 22 | 2815 | 102 21 30 | 2805 |
| | Mars | W. | 50 24 28 | 2710 | 52 0 55 | 2698 | 53 37 37 | 2687 | 55 14 34 | 2676 |
| | Spica | W. | 43 36 46 | 2834 | 45 10 30 | 2822 | 46 44 29 | 2811 | 48 18 43 | 2799 |
| | a Aquilæ | E. | 61 23 25 | 4017 | 60 12 3 | 4045 | 59 1 8 | 4077 | 57 50 43 | 4110 |
| | Fomalhaut | E. | 85 20 48 | 3019 | 83 50 59 | 3010 | 82 20 59 | 3001 | 80 50 47 | 2991 |
| | Venus | E. | 90 55 17 | 3276 | 89 30 37 | 3264 | 88 5 43 | 3251 | 86 40 34 | 3238 |
| | Sun | E. | 120 58 41 | 3185 | 119 32 14 | 3173 | 118 5 33 | 3161 | 116 38 37 | 3149 |
| 27 | Mars | W. | 63 23 13 | 2615 | 65 1 47 | 2603 | 66 40 38 | 2590 | 68 19 47 | 2577 |
| | Spica | W. | 56 13 45 | 2738 | 57 49 34 | 2725 | 59 25 41 | 2712 | 61 2 5 | 2698 |
| | a Aquilæ | E. | 52 8 7 | 4347 | 51 1 58 | 4409 | 49 56 45 | 4480 | 48 52 34 | 4560 |
| | Fomalhaut | E. | 73 16 50 | 2945 | 71 45 28 | 2936 | 70 13 55 | 2927 | 68 42 10 | 2919 |
| | Venus | E. | 79 31 0 | 3172 | 78 4 17 | 3158 | 76 37 17 | 3143 | 75 10 0 | 3129 |
| | Sun | E. | 109 20 9 | 3083 | 107 51 39 | 3069 | 106 22 51 | 3055 | 104 53 46 | 3040 |
| 28 | Mars | W. | 76 40 14 | 2507 | 78 21 18 | 2492 | 80 2 43 | 2477 | 81 44 28 | 2462 |
| | Spica | W. | 69 8 43 | 2628 | 70 47 0 | 2612 | 72 25 38 | 2598 | 74 4 36 | 2582 |
| | Antares | W. | 23 14 38 | 2627 | 24 52 56 | 2612 | 26 31 35 | 2596 | 28 10 35 | 2581 |
| | Fomalhaut | E. | 61 0 54 | 2881 | 59 28 11 | 2876 | 57 55 22 | 2870 | 56 22 25 | 2866 |
| | Venus | E. | 67 48 57 | 3051 | 66 19 47 | 3034 | 64 50 17 | 3018 | 63 20 26 | 3001 |
| | Sun | E. | 97 23 44 | 2964 | 95 52 46 | 2947 | 94 21 27 | 2931 | 92 49 48 | 2915 |
| 29 | Mars | W. | 90 18 41 | 2384 | 92 2 38 | 2369 | 93 46 57 | 2353 | 95 31 39 | 2337 |
| | Spica | W. | 82 24 49 | 2503 | 84 5 58 | 2487 | 85 47 29 | 2470 | 87 29 24 | 2456 |
| | Antares | W. | 36 30 58 | 2502 | 38 12 9 | 2485 | 39 53 43 | 2469 | 41 35 40 | 2453 |
| | Fomalhaut | E. | 48 36 45 | 2862 | 47 3 38 | 2866 | 45 30 36 | 2873 | 43 57 42 | 2883 |
| | Venus | E. | 55 45 53 | 2915 | 54 13 53 | 2897 | 52 41 30 | 2880 | 51 8 45 | 2862 |
| | Sun | E. | 85 6 11 | 2829 | 83 32 21 | 2812 | 81 58 9 | 2795 | 80 23 34 | 2777 |
| 30 | Mars | W. | 104 21 8 | 2256 | 106 8 13 | 2239 | 107 55 43 | 2223 | 109 43 37 | 2207 |
| | Spica | W. | 96 4 43 | 2372 | 97 48 58 | 2355 | 99 33 37 | 2339 | 101 18 40 | 2323 |
| | Antares | W. | 50 11 17 | 2369 | 51 55 36 | 2353 | 53 40 18 | 2336 | 55 25 25 | 2320 |
| | Fomalhaut | E. | 36 17 53 | 2993 | 34 47 31 | 3034 | 33 18 1 | 3085 | 31 49 32 | 3144 |
| | Venus | E. | 43 19 13 | 2772 | 41 44 9 | 2754 | 40 8 41 | 2737 | 38 32 50 | 2719 |
| | Sun | E. | 72 24 47 | 2686 | 70 47 51 | 2669 | 69 10 31 | 2652 | 67 32 46 | 2634 |
| 31 | Spica | W. | 110 9 48 | 2243 | 111 57 12 | 2227 | 113 44 59 | 2212 | 115 33 9 | 2198 |
| | Antares | W. | 64 16 54 | 2239 | 66 4 23 | 2224 | 67 52 15 | 2208 | 69 40 30 | 2194 |
| | Venus | E. | 30 27 50 | 2635 | 28 49 43 | 2620 | 27 11 15 | 2604 | 25 32 25 | 2590 |
| | Sun | E. | 59 18 6 | 2548 | 57 37 59 | 2531 | 55 57 29 | 2515 | 54 16 37 | 2499 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S *Apparent* Declination. | THE SUN'S Diff. for 1 hour. | THE SUN'S Semi-diameter. | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be added to* / *subtracted from* *Apparent Time*. | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Tues. | 1 | 0 43 58.05 | 9.102 | N. 4 43 48.3 | 57.77 | 16 1.87 | 64.50 | 3 50.63 | 0.754 |
| Wed. | 2 | 0 47 36.53 | 9.107 | 5 6 52.1 | 57.56 | 16 1.59 | 64.53 | 3 32.60 | 0.748 |
| Thur. | 3 | 0 51 15.16 | 9.115 | 5 29 50.5 | 57.32 | 16 1.31 | 64.55 | 3 14.73 | 0.741 |
| Fri. | 4 | 0 54 53.93 | 9.122 | 5 52 43.2 | 57.08 | 16 1.04 | 64.57 | 2 57.00 | 0.733 |
| Sat. | 5 | 0 58 32.91 | 9.129 | 6 15 29.9 | 56.82 | 16 0.76 | 64.60 | 2 39.47 | 0.726 |
| *Sun.* | 6 | 1 2 12.05 | 9.137 | 6 38 10.1 | 56.54 | 16 0.48 | 64.63 | 2 22.11 | 0.718 |
| Mon. | 7 | 1 5 51.41 | 9.146 | 7 0 43.4 | 56.25 | 16 0.21 | 64.67 | 2 4.97 | 0.709 |
| Tues. | 8 | 1 9 30.98 | 9.155 | 7 23 9.5 | 55.94 | 15 59.94 | 64.61 | 1 48.04 | 0.700 |
| Wed. | 9 | 1 13 10.80 | 9.166 | 7 45 28.2 | 55.62 | 15 59.67 | 64.74 | 1 31.34 | 0.691 |
| Thur. | 10 | 1 16 50.86 | 9.176 | 8 7 38.9 | 55.28 | 15 59.40 | 64.78 | 1 14.90 | 0.679 |
| Fri. | 11 | 1 20 31.18 | 9.187 | 8 29 41.3 | 54.93 | 15 59.13 | 64.82 | 0 58.70 | 0.668 |
| Sat. | 12 | 1 24 11.78 | 9.199 | 8 51 35.1 | 54.56 | 15 58.86 | 64.87 | 0 42.80 | 0.657 |
| *Sun.* | 13 | 1 27 52.68 | 9.212 | 9 13 19.8 | 54.18 | 15 58.60 | 64.91 | 0 27.19 | 0.644 |
| Mon. | 14 | 1 31 33.88 | 9.227 | 9 34 55.3 | 53.78 | 15 58.34 | 64.96 | 0 11.87 | 0.631 |
| Tues. | 15 | 1 35 15.44 | 9.240 | 9 56 21.3 | 53.38 | 15 58.08 | 65.01 | 0 3.09 | 0.617 |
| Wed. | 16 | 1 38 57.33 | 9.255 | 10 17 37.3 | 52.96 | 15 57.82 | 65.06 | 0 17.72 | 0.603 |
| Thur. | 17 | 1 42 39.59 | 9.270 | 10 38 43.0 | 52.53 | 15 57.56 | 65.12 | 0 31.97 | 0.587 |
| Fri. | 18 | 1 46 22.21 | 9.287 | 10 59 38.1 | 52.08 | 15 57.30 | 65.18 | 0 45.86 | 0.570 |
| Sat. | 19 | 1 50 5.24 | 9.304 | 11 20 22.3 | 51.62 | 15 57.04 | 65.24 | 0 59.35 | 0.553 |
| *Sun.* | 20 | 1 53 48.70 | 9.321 | 11 40 55.6 | 51.14 | 15 56.78 | 65.30 | 1 12.42 | 0.535 |
| Mon. | 21 | 1 57 32.58 | 9.339 | 12 1 17.5 | 50.65 | 15 56.52 | 65.36 | 1 25.04 | 0.517 |
| Tues. | 22 | 2 1 16.90 | 9.357 | 12 21 27.4 | 50.16 | 15 56.26 | 65.43 | 1 37.25 | 0.498 |
| Wed. | 23 | 2 5 1.70 | 9.376 | 12 41 25.4 | 49.66 | 15 56.00 | 65.49 | 1 48.97 | 0.478 |
| Thur. | 24 | 2 8 46.95 | 9.395 | 13 1 11.0 | 49.13 | 15 55.74 | 65.56 | 2 0.24 | 0.457 |
| Fri. | 25 | 2 12 32.72 | 9.418 | 13 20 43.7 | 48.60 | 15 55.49 | 65.63 | 2 11.00 | 0.437 |
| Sat. | 26 | 2 16 18.99 | 9.440 | 13 40 3.4 | 48.05 | 15 55.24 | 65.70 | 2 21.26 | 0.416 |
| *Sun.* | 27 | 2 20 5.78 | 9.461 | 13 59 9.8 | 47.49 | 15 54.99 | 65.77 | 2 30.99 | 0.395 |
| Mon. | 28 | 2 23 53.11 | 9.483 | 14 18 2.5 | 46.91 | 15 54.74 | 65.84 | 2 40.19 | 0.373 |
| Tues. | 29 | 2 27 40.97 | 9.506 | 14 36 41.2 | 46.32 | 15 54.49 | 65.92 | 2 48.86 | 0.349 |
| Wed. | 30 | 2 31 29.37 | 9.529 | 14 55 5.7 | 45.72 | 15 54.25 | 66.00 | 2 57.00 | 0.327 |
| Thur. | 31 | 2 35 18.32 | 9.552 | N.15 13 15.8 | 45.11 | 15 54.01 | 66.07 | 3 4.59 | 0.304 |

**Note.**—*Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S Apparent Right Ascension. | Diff. for 1 hour. | Apparent Declination. | Diff. for 1 hour. | Equation of Time, to be *subtracted from* / *added to* *Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Tues. | 1 | 0 43 57.46 | 9.102 | N. 4 43 44.6 | 57.77 | 3 50.68 | 0.754 | 23 40 6.78 |
| Wed. | 2 | 0 47 35.98 | 9.107 | 5 6 48.7 | 57.56 | 3 32.65 | 0.748 | 23 44 3.33 |
| Thur. | 3 | 0 51 14.66 | 9.115 | 5 29 47.4 | 57.32 | 3 14.77 | 0.741 | 23 47 59.89 |
| Fri. | 4 | 0 54 53.48 | 9.122 | 5 52 40.4 | 57.08 | 2 57.04 | 0.733 | 23 51 56.44 |
| Sat. | 5 | 0 58 32.50 | 9.129 | 6 15 27.4 | 56.82 | 2 39.51 | 0.726 | 23 55 52.99 |
| *Sun.* | 6 | 1 2 11.69 | 9.137 | 6 38 7.9 | 56.54 | 2 22.14 | 0.718 | 23 59 49.55 |
| Mon. | 7 | 1 5 51.09 | 9.146 | 7 0 41.5 | 56.25 | 2 4.99 | 0.709 | 1 3 46.10 |
| Tues. | 8 | 1 9 30.71 | 9.155 | 7 23 7.9 | 55.94 | 1 48.06 | 0.700 | 1 7 42.65 |
| Wed. | 9 | 1 13 10.57 | 9.166 | 7 45 26.8 | 55.62 | 1 31.36 | 0.691 | 1 11 39.21 |
| Thur. | 10 | 1 16 50.67 | 9.176 | 8 7 37.7 | 55.28 | 1 14.91 | 0.679 | 1 15 35.76 |
| Fri. | 11 | 1 20 31.03 | 9.187 | 8 29 40.3 | 54.93 | 0 58.71 | 0.668 | 1 19 32.32 |
| Sat. | 12 | 1 24 11.67 | 9.199 | 8 51 34.4 | 54.56 | 0 42.80 | 0.657 | 1 23 28.87 |
| *Sun.* | 13 | 1 27 52.61 | 9.212 | 9 13 19.4 | 54.18 | 0 27.19 | 0.644 | 1 27 25.42 |
| Mon. | 14 | 1 31 33.85 | 9.227 | 9 34 55.1 | 53.78 | 0 11.87 | 0.631 | 1 31 21.98 |
| Tues. | 15 | 1 35 15.44 | 9.240 | 9 56 21.3 | 53.38 | 0 3.09 | 0.617 | 1 35 18.53 |
| Wed. | 16 | 1 38 57.37 | 9.255 | 10 17 37.5 | 52.96 | 0 17.72 | 0.603 | 1 39 15.09 |
| Thur. | 17 | 1 42 39.66 | 9.270 | 10 38 43.4 | 52.53 | 0 31.98 | 0.587 | 1 43 11.64 |
| Fri. | 18 | 1 46 22.32 | 9.287 | 10 59 38.8 | 52.08 | 0 45.87 | 0.570 | 1 47 8.19 |
| Sat. | 19 | 1 50 5.39 | 9.304 | 11 20 23.2 | 51.62 | 0 59.36 | 0.553 | 1 51 4.75 |
| *Sun.* | 20 | 1 53 48.88 | 9.321 | 11 40 56.6 | 51.14 | 1 12.43 | 0.535 | 1 55 1.31 |
| Mon. | 21 | 1 57 32.80 | 9.339 | 12 1 18.5 | 50.65 | 1 25.06 | 0.517 | 1 58 57.86 |
| Tues. | 22 | 2 1 17.15 | 9.357 | 12 21 28.5 | 50.16 | 1 37.27 | 0.498 | 2 2 54.42 |
| Wed. | 23 | 2 5 1.98 | 9.376 | 12 41 26.5 | 49.66 | 1 48.99 | 0.478 | 2 6 50.97 |
| Thur. | 24 | 2 8 47.27 | 9.395 | 13 1 12.2 | 49.13 | 2 0.26 | 0.457 | 2 10 47.53 |
| Fri. | 25 | 2 12 33.06 | 9.418 | 13 20 45.1 | 48.60 | 2 11.02 | 0.437 | 2 14 44.08 |
| Sat. | 26 | 2 16 19.36 | 9.440 | 13 40 5.0 | 48.05 | 2 21.28 | 0.416 | 2 18 40.64 |
| *Sun.* | 27 | 2 20 6.18 | 9.461 | 13 59 11.6 | 47.49 | 2 31.01 | 0.395 | 2 22 37.19 |
| Mon. | 28 | 2 23 53.54 | 9.483 | 14 18 4.5 | 46.91 | 2 40.21 | 0.373 | 2 26 33.75 |
| Tues. | 29 | 2 27 41.42 | 9.506 | 14 36 43.4 | 46.32 | 2 48.88 | 0.349 | 2 30 30.30 |
| Wed. | 30 | 2 31 29.84 | 9.529 | 14 55 8.0 | 45.72 | 2 57.02 | 0.327 | 2 34 26.86 |
| Thur. | 31 | 2 35 18.81 | 9.552 | N.15 13 18.1 | 45.11 | 3 4.60 | 0.304 | 2 38 23.41 |

**Note.** — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 92 | 11 57 28.6 | 57 23.6 | 147.82 | —0.78 | 0.0000656 | 53.2 | 23 16 3.89 |
| 2 | 93 | 12 56 35.5 | 56 30.4 | 147.74 | 0.70 | .0001928 | 53.0 | 23 12 7.98 |
| 3 | 94 | 13 55 40.6 | 55 35.4 | 147.66 | 0.61 | .0003195 | 52.6 | 23 8 12.07 |
| 4 | 95 | 14 54 43.7 | 54 38.4 | 147.58 | 0.49 | .0004454 | 52.5 | 23 4 16.16 |
| 5 | 96 | 15 53 44.9 | 53 39.5 | 147.50 | 0.36 | .0005705 | 52.0 | 23 0 20.25 |
| 6 | 97 | 16 52 43.9 | 52 38.4 | 147.41 | 0.23 | .0006948 | 51.7 | 22 56 24.34 |
| 7 | 98 | 17 51 40.9 | 51 35.2 | 147.32 | —0.10 | .0008183 | 51.3 | 22 52 28.44 |
| 8 | 99 | 18 50 35.7 | 50 29.9 | 147.23 | +0.02 | .0009409 | 50.9 | 22 48 32.54 |
| 9 | 100 | 19 49 28.4 | 49 22.5 | 147.14 | 0.14 | .0010626 | 50.5 | 22 44 36.62 |
| 10 | 101 | 20 48 18.6 | 48 12.6 | 147.04 | 0.21 | .0011834 | 50.2 | 22 40 40.72 |
| 11 | 102 | 21 47 6.6 | 47 0.5 | 146.95 | 0.28 | .0013037 | 50.0 | 22 36 44.80 |
| 12 | 103 | 22 45 52.4 | 45 46.2 | 146.86 | 0.30 | .0014235 | 49.8 | 22 32 48.89 |
| 13 | 104 | 23 44 35.9 | 44 29.5 | 146.77 | 0.31 | .0015427 | 49.6 | 22 28 52.99 |
| 14 | 105 | 24 43 17.1 | 43 10.6 | 146.68 | 0.29 | .0016616 | 49.4 | 22 24 57.08 |
| 15 | 106 | 25 41 56.1 | 41 49.5 | 146.59 | 0.22 | .0017800 | 49.3 | 22 21 1.18 |
| 16 | 107 | 26 40 33.0 | 40 26.2 | 146.50 | 0.14 | .0018981 | 49.3 | 22 17 5.26 |
| 17 | 108 | 27 39 7.7 | 39 0.7 | 146.41 | +0.03 | .0020163 | 49.2 | 22 13 9.36 |
| 18 | 109 | 28 37 40.3 | 37 33.2 | 146.33 | —0.09 | .0021343 | 49.2 | 22 9 13.45 |
| 19 | 110 | 29 36 10.9 | 36 3.7 | 146.25 | 0.22 | .0022522 | 49.1 | 22 5 17.54 |
| 20 | 111 | 30 34 39.7 | 34 32.4 | 146.17 | 0.37 | .0023698 | 49.0 | 22 1 21.62 |
| 21 | 112 | 31 33 6.6 | 32 59.2 | 146.09 | 0.50 | .0024873 | 48.9 | 21 57 25.72 |
| 22 | 113 | 32 31 31.6 | 31 24.1 | 146.01 | 0.61 | .0026045 | 48.6 | 21 53 29.81 |
| 23 | 114 | 33 29 54.8 | 29 47.1 | 145.94 | 0.71 | .0027215 | 48.4 | 21 49 33.91 |
| 24 | 115 | 34 28 16.4 | 28 8.6 | 145.87 | 0.78 | .0028382 | 48.3 | 21 45 37.99 |
| 25 | 116 | 35 26 36.4 | 26 28.5 | 145.79 | 0.83 | .0029543 | 48.2 | 21 41 42.09 |
| 26 | 117 | 36 24 54.9 | 24 46.8 | 145.72 | 0.85 | .0030698 | 48.0 | 21 37 46.17 |
| 27 | 118 | 37 23 11.9 | 23 3.6 | 145.66 | 0.84 | .0031844 | 47.5 | 21 33 50.27 |
| 28 | 119 | 38 21 27.4 | 21 18.9 | 145.60 | 0.79 | .0032980 | 47.1 | 21 29 54.36 |
| 29 | 120 | 39 19 41.3 | 19 32.8 | 145.54 | 0.72 | .0034104 | 46.6 | 21 25 58.45 |
| 30 | 121 | 40 17 53.7 | 17 45.1 | 145.48 | 0.63 | .0035214 | 45.9 | 21 22 2.53 |
| 31 | 122 | 41 16 4.7 | 15 55.9 | 145.42 | —0.52 | 0.0036310 | 45.4 | 21 18 6.63 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 16 22.5 | 16 28.4 | 59 59.0 | +1.90 | 60 20.8 | +1.70 | 21 41.7 | 2.15 | 25.7 |
| 2 | 16 33.5 | 16 37.7 | 60 39.7 | 1.44 | 60 55.2 | 1.13 | 22 34.4 | 2.08 | 26.7 |
| 3 | 16 40.9 | 16 42.9 | 61 6.8 | 0.79 | 61 14.1 | +0.42 | 23 25.8 | 2.05 | 27.7 |
| 4 | 16 43.6 | 16 43.0 | 61 16.8 | +0.02 | 61 14.6 | −0.39 | ☌ | | 28.7 |
| 5 | 16 41.1 | 16 37.9 | 61 7.5 | −0.78 | 60 55.8 | 1.15 | 0 17.3 | 2.08 | 0.3 |
| 6 | 16 33.5 | 16 28.1 | 60 39.8 | 1.48 | 60 20.1 | 1.77 | 1 10.1 | 2.15 | 1.3 |
| 7 | 16 21.9 | 16 15.0 | 59 57.2 | 2.01 | 59 31.8 | 2.19 | 2 4.9 | 2.24 | 2.3 |
| 8 | 16 7.6 | 15 59.9 | 59 4.6 | 2.32 | 58 36.2 | 2.39 | 3 1.9 | 2.31 | 3.3 |
| 9 | 15 52.0 | 15 44.2 | 58 7.3 | 2.40 | 57 38.6 | 2.36 | 4 0.3 | 2.34 | 4.3 |
| 10 | 15 36.6 | 15 29.2 | 57 10.6 | 2.29 | 56 43.7 | 2.18 | 4 58.6 | 2.30 | 5.3 |
| 11 | 15 22.3 | 15 15.9 | 56 18.3 | 2.04 | 55 54.7 | 1.88 | 5 54.9 | 2.19 | 6.3 |
| 12 | 15 10.0 | 15 4.8 | 55 33.1 | 1.70 | 55 13.8 | 1.51 | 6 47.8 | 2.04 | 7.3 |
| 13 | 15 0.1 | 14 56.1 | 54 56.8 | 1.32 | 54 42.1 | 1.13 | 7 36.6 | 1.88 | 8.3 |
| 14 | 14 52.7 | 14 50.0 | 54 29.7 | 0.94 | 54 19.6 | 0.75 | 8 21.7 | 1.74 | 9.3 |
| 15 | 14 47.9 | 14 46.4 | 54 11.8 | 0.56 | 54 6.2 | 0.38 | 9 3.9 | 1.64 | 10.3 |
| 16 | 14 45.4 | 14 44.9 | 54 2.6 | −0.22 | 54 1.0 | −0.06 | 9 44.0 | 1.58 | 11.3 |
| 17 | 14 45.0 | 14 45.5 | 54 1.2 | +0.09 | 54 3.2 | +0.23 | 10 23.0 | 1.56 | 12.3 |
| 18 | 14 46.5 | 14 47.9 | 54 6.7 | 0.35 | 54 11.7 | 0.47 | 11 2.0 | 1.58 | 13.3 |
| 19 | 14 49.6 | 14 51.6 | 54 18.0 | 0.58 | 54 25.6 | 0.68 | 11 42.1 | 1.64 | 14.3 |
| 20 | 14 54.0 | 14 56.7 | 54 34.3 | 0.77 | 54 44.1 | 0.86 | 12 24.3 | 1.74 | 15.3 |
| 21 | 14 59.6 | 15 2.8 | 54 55.0 | 0.95 | 55 6.8 | 1.02 | 13 9.4 | 1.88 | 16.3 |
| 22 | 15 6.3 | 15 10.0 | 55 19.4 | 1.09 | 55 32.9 | 1.16 | 13 58.2 | 2.03 | 17.3 |
| 23 | 15 13.9 | 15 18.0 | 55 47.3 | 1.24 | 56 2.6 | 1.31 | 14 50.9 | 2.17 | 18.3 |
| 24 | 15 22.4 | 15 27.0 | 56 18.7 | 1.38 | 56 35.6 | 1.44 | 15 46.8 | 2.28 | 19.3 |
| 25 | 15 31.8 | 15 36.8 | 56 53.2 | 1.50 | 57 11.6 | 1.56 | 16 44.5 | 2.32 | 20.3 |
| 26 | 15 42.0 | 15 47.4 | 57 30.7 | 1.61 | 57 50.3 | 1.65 | 17 42.2 | 2.29 | 21.3 |
| 27 | 15 52.8 | 15 58.3 | 58 10.3 | 1.67 | 58 30.5 | 1.68 | 18 38.2 | 2.20 | 22.3 |
| 28 | 16 3.8 | 16 9.2 | 58 50.7 | 1.66 | 59 10.4 | 1.61 | 19 31.8 | 2.10 | 23.3 |
| 29 | 16 14.3 | 16 19.1 | 59 29.3 | 1.52 | 59 46.9 | 1.39 | 20 23.3 | 2.03 | 24.3 |
| 30 | 16 23.4 | 16 27.1 | 60 2.7 | 1.22 | 60 16.2 | 1.01 | 21 13.4 | 2.00 | 25.3 |
| 31 | 16 30.0 | 16 32.1 | 60 27.0 | +0.76 | 60 34.6 | +0.48 | 22 3.4 | 2.02 | 26.3 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 34 6.49 | 2.3956 | S.19 30 56 8 | 12.982 |
| 1 | 21 36 30.11 | 2.3919 | 19 17 53.9 | 13.114 |
| 2 | 21 38 53.51 | 2.3882 | 19 4 43.1 | 13.245 |
| 3 | 21 41 16.69 | 2.3845 | 18 51 24.5 | 13.375 |
| 4 | 21 43 39.65 | 2.3808 | 18 37 58.1 | 13.503 |
| 5 | 21 46 2.38 | 2.3770 | 18 24 24.2 | 13.628 |
| 6 | 21 48 24.89 | 2.3733 | 18 10 42.8 | 13.752 |
| 7 | 21 50 47.18 | 2.3697 | 17 56 53.9 | 13.876 |
| 8 | 21 53 9.25 | 2.3060 | 17 42 57.7 | 13.998 |
| 9 | 21 55 31.10 | 2.3623 | 17 28 54.2 | 14.118 |
| 10 | 21 57 52.73 | 2.3587 | 17 14 43.5 | 14.237 |
| 11 | 22 0 14.14 | 2.3550 | 17 0 25.8 | 14.353 |
| 12 | 22 2 35.33 | 2.3514 | 16 46 1.1 | 14.469 |
| 13 | 22 4 56.31 | 2.3479 | 16 31 29.5 | 14.583 |
| 14 | 22 7 17.08 | 2.3443 | 16 16 51.2 | 14.694 |
| 15 | 22 9 37.63 | 2.3408 | 16 2 6.2 | 14.805 |
| 16 | 22 11 57.97 | 2.3373 | 15 47 14.6 | 14.914 |
| 17 | 22 14 18.10 | 2.3338 | 15 32 16.5 | 15.022 |
| 18 | 22 16 38.02 | 2.3304 | 15 17 12.0 | 15.127 |
| 19 | 22 18 57.74 | 2.3270 | 15 2 1.2 | 15.230 |
| 20 | 22 21 17.26 | 2.3236 | 14 46 44.3 | 15.332 |
| 21 | 22 23 36.57 | 2.3203 | 14 31 21.3 | 15.433 |
| 22 | 22 25 55.69 | 2.3170 | 14 15 52.3 | 15.532 |
| 23 | 22 28 14.61 | 2.3138 | S.14 0 17.4 | 15.629 |

### WEDNESDAY 2.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 22 30 33.34 | 2.3106 | S.13 44 36.8 | 15.724 |
| 1 | 22 32 51.88 | 2.3074 | 13 28 50.5 | 15.818 |
| 2 | 22 35 10.23 | 2.3043 | 13 12 58.7 | 15.909 |
| 3 | 22 37 28.40 | 2.3013 | 12 57 1.4 | 16.000 |
| 4 | 22 39 46.38 | 2.2983 | 12 40 58.7 | 16.088 |
| 5 | 22 42 4.19 | 2.2953 | 12 24 50.9 | 16.173 |
| 6 | 22 44 21.82 | 2.2924 | 12 8 38.0 | 16.257 |
| 7 | 22 46 39.28 | 2.2895 | 11 52 20.0 | 16.340 |
| 8 | 22 48 56.57 | 2.2867 | 11 35 57.2 | 16.420 |
| 9 | 22 51 13.69 | 2.2840 | 11 19 29.6 | 16.500 |
| 10 | 22 53 30.65 | 2.2813 | 11 2 57.2 | 16.578 |
| 11 | 22 55 47.45 | 2.2787 | 10 46 20.3 | 16.652 |
| 12 | 22 58 4.09 | 2.2761 | 10 29 39.0 | 16.725 |
| 13 | 23 0 20.58 | 2.2736 | 10 12 53.3 | 16.797 |
| 14 | 23 2 36.92 | 2.2712 | 9 56 3.4 | 16.866 |
| 15 | 23 4 53.12 | 2.2688 | 9 39 9.4 | 16.933 |
| 16 | 23 7 9.17 | 2.2665 | 9 22 11.4 | 16.999 |
| 17 | 23 9 25.09 | 2.2643 | 9 5 9.5 | 17.063 |
| 18 | 23 11 40.88 | 2.2621 | 8 48 3.9 | 17.124 |
| 19 | 23 13 56.54 | 2.2599 | 8 30 54.6 | 17.184 |
| 20 | 23 16 12.07 | 2.2578 | 8 13 41.8 | 17.242 |
| 21 | 23 18 27.47 | 2.2558 | 7 56 25.6 | 17.298 |
| 22 | 23 20 42.76 | 2.2539 | 7 39 6.1 | 17.352 |
| 23 | 23 22 57.94 | 2.2521 | 7 21 43.4 | 17.404 |
| 24 | 23 25 13.01 | 2.2503 | S. 7 4 17.6 | 17.454 |

### THURSDAY 3.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 25 13.01 | 2.2503 | S. 7 4 17.6 | 17.454 |
| 1 | 23 27 27.97 | 2.2485 | 6 46 48.9 | 17.502 |
| 2 | 23 29 42.83 | 2.2469 | 6 29 17.4 | 17.548 |
| 3 | 23 31 57.60 | 2.2453 | 6 11 43.2 | 17.592 |
| 4 | 23 34 12.27 | 2.2438 | 5 54 6.4 | 17.634 |
| 5 | 23 36 26.86 | 2.2425 | 5 36 27.1 | 17.674 |
| 6 | 23 38 41.37 | 2.2412 | 5 18 45.5 | 17.712 |
| 7 | 23 40 55.80 | 2.2399 | 5 1 1.6 | 17.748 |
| 8 | 23 43 10.16 | 2.2387 | 4 43 15.7 | 17.782 |
| 9 | 23 45 24.44 | 2.2376 | 4 25 27.8 | 17.814 |
| 10 | 23 47 38.65 | 2.2365 | 4 7 38.0 | 17.844 |
| 11 | 23 49 52.81 | 2.2356 | 3 49 46.5 | 17.872 |
| 12 | 23 52 6.92 | 2.2347 | 3 31 53.4 | 17.898 |
| 13 | 23 54 20.97 | 2.2339 | 3 13 58.8 | 17.922 |
| 14 | 23 56 34.98 | 2.2332 | 2 56 2.8 | 17.943 |
| 15 | 23 58 48.95 | 2.2325 | 2 38 5.6 | 17.963 |
| 16 | 0 1 2.88 | 2.2319 | 2 20 7.2 | 17.981 |
| 17 | 0 3 16.78 | 2.2313 | 2 2 7.9 | 17.996 |
| 18 | 0 5 30.64 | 2.2308 | 1 44 7.7 | 18.010 |
| 19 | 0 7 44.48 | 2.2305 | 1 26 6.7 | 18.022 |
| 20 | 0 9 58.31 | 2.2303 | 1 8 5.1 | 18.031 |
| 21 | 0 12 12.12 | 2.2302 | 0 50 3.0 | 18.038 |
| 22 | 0 14 25.93 | 2.2301 | 0 32 0.5 | 18.042 |
| 23 | 0 16 39.73 | 2.2300 | S. 0 13 57.8 | 18.047 |

### FRIDAY 4.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 0 18 53.53 | 2.2300 | N. 0 4 5.1 | 18.046 |
| 1 | 0 21 7.33 | 2.2302 | 0 22 8.0 | 18.047 |
| 2 | 0 23 21.15 | 2.2304 | 0 40 10.8 | 18.044 |
| 3 | 0 25 34.98 | 2.2307 | 0 58 13.3 | 18.039 |
| 4 | 0 27 48.83 | 2.2311 | 1 16 15.5 | 18.033 |
| 5 | 0 30 2.71 | 2.2315 | 1 34 17.2 | 18.023 |
| 6 | 0 32 16.61 | 2.2319 | 1 52 18.3 | 18.012 |
| 7 | 0 34 30.54 | 2.2326 | 2 10 18.7 | 17.999 |
| 8 | 0 36 44.52 | 2.2333 | 2 28 18.2 | 17.983 |
| 9 | 0 38 58.54 | 2.2340 | 2 46 16.7 | 17.967 |
| 10 | 0 41 12.60 | 2.2348 | 3 4 14.2 | 17.948 |
| 11 | 0 43 26.72 | 2.2358 | 3 22 10.4 | 17.925 |
| 12 | 0 45 40.90 | 2.2368 | 3 40 5.2 | 17.902 |
| 13 | 0 47 55.13 | 2.2378 | 3 57 58.6 | 17.876 |
| 14 | 0 50 9.43 | 2.2390 | 4 15 50.3 | 17.848 |
| 15 | 0 52 23.81 | 2.2402 | 4 33 40.4 | 17.819 |
| 16 | 0 54 38.26 | 2.2415 | 4 51 28.6 | 17.787 |
| 17 | 0 56 52.79 | 2.2428 | 5 9 14.8 | 17.753 |
| 18 | 0 59 7.40 | 2.2443 | 5 26 59.0 | 17.718 |
| 19 | 1 1 22.10 | 2.2458 | 5 44 41.0 | 17.680 |
| 20 | 1 3 36.89 | 2.2473 | 6 2 20.6 | 17.639 |
| 21 | 1 5 51.78 | 2.2490 | 6 19 57.7 | 17.596 |
| 22 | 1 8 6.77 | 2.2507 | 6 37 32.3 | 17.553 |
| 23 | 1 10 21.87 | 2.2525 | 6 55 4.1 | 17.507 |
| 24 | 1 12 37.07 | 2.2543 | N. 7 12 33.1 | 17.459 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ″ | ″ |
| 0 | 1 12 37.07 | 2.2543 | N. 7 12 33.1 | 17.459 |
| 1 | 1 14 52.39 | 2.2563 | 7 29 59.2 | 17.409 |
| 2 | 1 17 7.83 | 2.2583 | 7 47 22.2 | 17.357 |
| 3 | 1 19 23.38 | 2.2603 | 8 4 42.0 | 17.303 |
| 4 | 1 21 39.06 | 2.2624 | 8 21 58.6 | 17.247 |
| 5 | 1 23 54.87 | 2.2646 | 8 39 11.7 | 17.188 |
| 6 | 1 26 10.82 | 2.2669 | 8 56 21.2 | 17.128 |
| 7 | 1 28 26.90 | 2.2692 | 9 13 27.1 | 17.067 |
| 8 | 1 30 43.12 | 2.2716 | 9 30 29.2 | 17.003 |
| 9 | 1 32 59.49 | 2.2740 | 9 47 27.4 | 16.937 |
| 10 | 1 35 16.00 | 2.2765 | 10 4 21.6 | 16.868 |
| 11 | 1 37 32.67 | 2.2791 | 10 21 11.6 | 16.798 |
| 12 | 1 39 49.49 | 2.2817 | 10 37 57.3 | 16.726 |
| 13 | 1 42 6.47 | 2.2843 | 10 54 38.7 | 16.652 |
| 14 | 1 44 23.61 | 2.2871 | 11 11 15.6 | 16.577 |
| 15 | 1 46 40.92 | 2.2899 | 11 27 47.9 | 16.499 |
| 16 | 1 48 58.40 | 2.2928 | 11 44 15.5 | 16.419 |
| 17 | 1 51 16.05 | 2.2956 | 12 0 38.2 | 16.337 |
| 18 | 1 53 33.87 | 2.2984 | 12 16 56.0 | 16.254 |
| 19 | 1 55 51.86 | 2.3014 | 12 33 8.7 | 16.169 |
| 20 | 1 58 10.04 | 2.3046 | 12 49 16.2 | 16.082 |
| 21 | 2 0 28.41 | 2.3077 | 13 5 18.5 | 15.993 |
| 22 | 2 2 46.96 | 2.3108 | 13 21 15.4 | 15.902 |
| 23 | 2 5 5.70 | 2.3139 | N.13 37 6.7 | 15.809 |

### SUNDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 2 7 24.63 | 2.3171 | N.13 52 52.5 | 15.715 |
| 1 | 2 9 43.75 | 2.3203 | 14 8 32.5 | 15.618 |
| 2 | 2 12 3.07 | 2.3236 | 14 24 6.6 | 15.520 |
| 3 | 2 14 22.58 | 2.3269 | 14 39 34.9 | 15.421 |
| 4 | 2 16 42.29 | 2.3302 | 14 54 57.1 | 15.318 |
| 5 | 2 19 2.20 | 2.3335 | 15 10 13.1 | 15.214 |
| 6 | 2 21 22.31 | 2.3368 | 15 25 22.8 | 15.109 |
| 7 | 2 23 42.62 | 2.3403 | 15 40 26.2 | 15.002 |
| 8 | 2 26 3.14 | 2.3438 | 15 55 23.0 | 14.893 |
| 9 | 2 28 23.88 | 2.3473 | 16 10 13.3 | 14.783 |
| 10 | 2 30 44.82 | 2.3508 | 16 24 57.0 | 14.671 |
| 11 | 2 33 5.97 | 2.3543 | 16 39 33.8 | 14.557 |
| 12 | 2 35 27.34 | 2.3579 | 16 54 3.8 | 14.442 |
| 13 | 2 37 48.92 | 2.3614 | 17 8 26.8 | 14.324 |
| 14 | 2 40 10.71 | 2.3649 | 17 22 42.7 | 14.206 |
| 15 | 2 42 32.71 | 2.3684 | 17 36 51.5 | 14.087 |
| 16 | 2 44 54.92 | 2.3720 | 17 50 53.1 | 13.964 |
| 17 | 2 47 17.35 | 2.3757 | 18 4 47.2 | 13.840 |
| 18 | 2 49 40.00 | 2.3793 | 18 18 33.9 | 13.716 |
| 19 | 2 52 2.86 | 2.3828 | 18 32 13.1 | 13.589 |
| 20 | 2 54 25.94 | 2.3864 | 18 45 44.6 | 13.460 |
| 21 | 2 56 49.23 | 2.3900 | 18 59 8.3 | 13.330 |
| 22 | 2 59 12.74 | 2.3937 | 19 12 24.2 | 13.199 |
| 23 | 3 1 36.47 | 2.3973 | 19 25 32.2 | 13.067 |
| 24 | 3 4 0.41 | 2.4008 | N.19 38 32.2 | 12.933 |

### MONDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 4 0.41 | 2.4008 | N.19 38 32.2 | 12.933 |
| 1 | 3 6 24.57 | 2.4044 | 19 51 24.1 | 12.797 |
| 2 | 3 8 48.94 | 2.4079 | 20 4 7.8 | 12.659 |
| 3 | 3 11 13.52 | 2.4114 | 20 16 43.2 | 12.521 |
| 4 | 3 13 38.31 | 2.4149 | 20 29 10.3 | 12.382 |
| 5 | 3 16 3.31 | 2.4184 | 20 41 29.0 | 12.240 |
| 6 | 3 18 28.52 | 2.4219 | 20 53 39.1 | 12.097 |
| 7 | 3 20 53.94 | 2.4253 | 21 5 40.6 | 11.953 |
| 8 | 3 23 19.56 | 2.4288 | 21 17 33.5 | 11.809 |
| 9 | 3 25 45.39 | 2.4322 | 21 29 17.7 | 11.663 |
| 10 | 3 28 11.42 | 2.4355 | 21 40 53.1 | 11.515 |
| 11 | 3 30 37.65 | 2.4388 | 21 52 19.5 | 11.365 |
| 12 | 3 33 4.07 | 2.4420 | 22 3 36.9 | 11.215 |
| 13 | 3 35 30.69 | 2.4452 | 22 14 45.3 | 11.064 |
| 14 | 3 37 57.50 | 2.4484 | 22 25 44.6 | 10.913 |
| 15 | 3 40 24.50 | 2.4516 | 22 36 34.8 | 10.760 |
| 16 | 3 42 51.69 | 2.4547 | 22 47 15.8 | 10.606 |
| 17 | 3 45 19.06 | 2.4577 | 22 57 47.5 | 10.450 |
| 18 | 3 47 46.61 | 2.4606 | 23 8 9.8 | 10.293 |
| 19 | 3 50 14.33 | 2.4636 | 23 18 22.7 | 10.136 |
| 20 | 3 52 42.23 | 2.4665 | 23 28 26.1 | 9.978 |
| 21 | 3 55 10.31 | 2.4694 | 23 38 20.0 | 9.818 |
| 22 | 3 57 38.56 | 2.4721 | 23 48 4.3 | 9.657 |
| 23 | 4 0 6.96 | 2.4747 | N.23 57 38.9 | 9.496 |

### TUESDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 4 2 35.52 | 2.4773 | N.24 7 3.7 | 9.333 |
| 1 | 4 5 4.23 | 2.4799 | 24 16 18.8 | 9.169 |
| 2 | 4 7 33.09 | 2.4823 | 24 25 24.0 | 9.005 |
| 3 | 4 10 2.10 | 2.4846 | 24 34 19.4 | 8.841 |
| 4 | 4 12 31.25 | 2.4869 | 24 43 4.9 | 8.675 |
| 5 | 4 15 0.53 | 2.4892 | 24 51 40.4 | 8.508 |
| 6 | 4 17 29.95 | 2.4914 | 25 0 5.9 | 8.342 |
| 7 | 4 19 59.50 | 2.4934 | 25 8 21.4 | 8.174 |
| 8 | 4 22 29.16 | 2.4953 | 25 16 26.8 | 8.005 |
| 9 | 4 24 58.93 | 2.4971 | 25 24 22.0 | 7.836 |
| 10 | 4 27 28.81 | 2.4989 | 25 32 7.1 | 7.667 |
| 11 | 4 29 58.80 | 2.5007 | 25 39 42.0 | 7.496 |
| 12 | 4 32 28.89 | 2.5023 | 25 47 6.6 | 7.326 |
| 13 | 4 34 59.07 | 2.5037 | 25 54 21.0 | 7.154 |
| 14 | 4 37 29.33 | 2.5051 | 26 1 25.1 | 6.983 |
| 15 | 4 39 59.68 | 2.5065 | 26 8 18.9 | 6.811 |
| 16 | 4 42 30.11 | 2.5077 | 26 15 2.4 | 6.638 |
| 17 | 4 45 0.60 | 2.5088 | 26 21 35.5 | 6.465 |
| 18 | 4 47 31.16 | 2.5098 | 26 27 58.2 | 6.292 |
| 19 | 4 50 1.77 | 2.5106 | 26 34 10.5 | 6.118 |
| 20 | 4 52 32.43 | 2.5114 | 26 40 12.4 | 5.944 |
| 21 | 4 55 3.14 | 2.5121 | 26 46 3.8 | 5.770 |
| 22 | 4 57 33.88 | 2.5126 | 26 51 44.8 | 5.596 |
| 23 | 5 0 4.65 | 2.5130 | 26 57 15.3 | 5.420 |
| 24 | 5 2 35.44 | 2.5133 | N.27 2 35.2 | 5.244 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | WEDNESDAY 9. | | | | | FRIDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 5 2 35.44 | 2.5133 | N.27 2 35.2 | 5.244 | 0 | 7 1 21.43 | 2.3920 | N.27 56 17.3 | 2.814 |
| 1 | 5 5 6.25 | 2.5136 | 27 7 44.6 | 5.069 | 1 | 7 3 44.80 | 2.3870 | 27 53 23.9 | 2.965 |
| 2 | 5 7 37.07 | 2.5137 | 27 12 43.5 | 4.895 | 2 | 7 6 7.86 | 2.3819 | 27 50 21.5 | 3.116 |
| 3 | 5 10 7.89 | 2.5137 | 27 17 32.0 | 4.720 | 3 | 7 8 30.62 | 2.3767 | 27 47 10.0 | 3.266 |
| 4 | 5 12 38.71 | 2.5135 | 27 22 9.9 | 4.544 | 4 | 7 10 53.06 | 2.3714 | 27 43 49.6 | 3.413 |
| 5 | 5 15 9.51 | 2.5132 | 27 26 37.3 | 4.369 | 5 | 7 13 15.19 | 2.3661 | 27 40 20.4 | 3.559 |
| 6 | 5 17 40.29 | 2.5128 | 27 30 54.2 | 4.193 | 6 | 7 15 36.99 | 2.3607 | 27 36 42.5 | 3.705 |
| 7 | 5 20 11.05 | 2.5123 | 27 35 0.5 | 4.018 | 7 | 7 17 58.47 | 2.3553 | 27 32 55.8 | 3.850 |
| 8 | 5 22 41.77 | 2.5117 | 27 38 56.3 | 3.843 | 8 | 7 20 19.62 | 2.3497 | 27 29 0.5 | 3.994 |
| 9 | 5 25 12.45 | 2.5110 | 27 42 41.7 | 3.668 | 9 | 7 22 40.43 | 2.3441 | 27 24 56.5 | 4.137 |
| 10 | 5 27 43.09 | 2.5102 | 27 46 16.5 | 3.493 | 10 | 7 25 0.91 | 2.3385 | 27 20 44.0 | 4.278 |
| 11 | 5 30 13.67 | 2.5092 | 27 49 40.8 | 3.318 | 11 | 7 27 21.05 | 2.3328 | 27 16 23.1 | 4.419 |
| 12 | 5 32 44.18 | 2.5081 | 27 52 54.6 | 3.143 | 12 | 7 29 40.84 | 2.3270 | 27 11 53.7 | 4.559 |
| 13 | 5 35 14.63 | 2.5068 | 27 55 57.9 | 2.968 | 13 | 7 32 0.29 | 2.3212 | 27 7 16.0 | 4.697 |
| 14 | 5 37 45.00 | 2.5054 | 27 58 50.8 | 2.794 | 14 | 7 34 19.39 | 2.3153 | 27 2 30.1 | 4.834 |
| 15 | 5 40 15.28 | 2.5039 | 28 1 33.2 | 2.619 | 15 | 7 36 38.13 | 2.3094 | 26 57 35.9 | 4.971 |
| 16 | 5 42 45.47 | 2.5023 | 28 4 5.1 | 2.445 | 16 | 7 38 56.52 | 2.3035 | 26 52 33.6 | 5.106 |
| 17 | 5 45 15.56 | 2.5006 | 28 6 26.6 | 2.272 | 17 | 7 41 14.55 | 2.2976 | 26 47 23.2 | 5.240 |
| 18 | 5 47 45.55 | 2.4988 | 28 8 37.8 | 2.100 | 18 | 7 43 32.23 | 2.2916 | 26 42 4.8 | 5.373 |
| 19 | 5 50 15.42 | 2.4968 | 28 10 38.6 | 1.927 | 19 | 7 45 49.54 | 2.2855 | 26 36 38.4 | 5.505 |
| 20 | 5 52 45.17 | 2.4947 | 28 12 29.0 | 1.754 | 20 | 7 48 6.49 | 2.2794 | 26 31 4.2 | 5.635 |
| 21 | 5 55 14.79 | 2.4926 | 28 14 9.1 | 1.582 | 21 | 7 50 23.07 | 2.2733 | 26 25 22.2 | 5.765 |
| 22 | 5 57 44.28 | 2.4903 | 28 15 38.9 | 1.411 | 22 | 7 52 39.28 | 2.2671 | 26 19 32.4 | 5.893 |
| 23 | 6 0 13.62 | 2.4878 | N.28 16 58.4 | 1.239 | 23 | 7 54 55.12 | 2.2609 | N.26 13 35.0 | 6.019 |
| | THURSDAY 10. | | | | | SATURDAY 12. | | | |
| 0 | 6 2 42.81 | 2.4853 | N.28 18 7.6 | 1.068 | 0 | 7 57 10.59 | 2.2548 | N.26 7 30.1 | 6.145 |
| 1 | 6 5 11.85 | 2.4826 | 28 19 6.6 | 0.899 | 1 | 7 59 25.69 | 2.2486 | 26 1 17.6 | 6.270 |
| 2 | 6 7 40.72 | 2.4798 | 28 19 55.5 | 0.730 | 2 | 8 1 40.42 | 2.2423 | 25 54 57.7 | 6.394 |
| 3 | 6 10 9.43 | 2.4769 | 28 20 34.2 | 0.561 | 3 | 8 3 54.77 | 2.2360 | 25 48 30.3 | 6.517 |
| 4 | 6 12 37.96 | 2.4739 | 28 21 2.8 | 0.393 | 4 | 8 6 8.74 | 2.2297 | 25 41 55.6 | 6.638 |
| 5 | 6 15 6.30 | 2.4708 | 28 21 21.4 | 0.226 | 5 | 8 8 22.34 | 2.2235 | 25 35 13.7 | 6.758 |
| 6 | 6 17 34.45 | 2.4676 | 28 21 29.9 | 0.058 | 6 | 8 10 35.56 | 2.2172 | 25 28 24.6 | 6.877 |
| 7 | 6 20 2.41 | 2.4643 | 28 21 28.4 | 0.108 | 7 | 8 12 48.40 | 2.2109 | 25 21 28.4 | 6.995 |
| 8 | 6 22 30.16 | 2.4608 | 28 21 17.0 | 0.273 | 8 | 8 15 0.86 | 2.2046 | 25 14 25.2 | 7.112 |
| 9 | 6 24 57.70 | 2.4572 | 28 20 55.6 | 0.438 | 9 | 8 17 12.95 | 2.1983 | 25 7 15.0 | 7.228 |
| 10 | 6 27 25.02 | 2.4535 | 28 20 24.5 | 0.602 | 10 | 8 19 24.65 | 2.1919 | 24 59 57.9 | 7.342 |
| 11 | 6 29 52.12 | 2.4497 | 28 19 43.4 | 0.766 | 11 | 8 21 35.97 | 2.1856 | 24 52 33.9 | 7.456 |
| 12 | 6 32 18.99 | 2.4458 | 28 18 52.5 | 0.929 | 12 | 8 23 46.92 | 2.1793 | 24 45 3.2 | 7.568 |
| 13 | 6 34 45.62 | 2.4419 | 28 17 51.9 | 1.090 | 13 | 8 25 57.49 | 2.1730 | 24 37 25.8 | 7.678 |
| 14 | 6 37 12.01 | 2.4379 | 28 16 41.7 | 1.251 | 14 | 8 28 7.68 | 2.1666 | 24 29 41.8 | 7.788 |
| 15 | 6 39 38.17 | 2.4338 | 28 15 21.8 | 1.412 | 15 | 8 30 17.48 | 2.1603 | 24 21 51.2 | 7.897 |
| 16 | 6 42 4.07 | 2.4294 | 28 13 52.3 | 1.571 | 16 | 8 32 26.91 | 2.1540 | 24 13 54.1 | 8.006 |
| 17 | 6 44 29.70 | 2.4250 | 28 12 13.3 | 1.729 | 17 | 8 34 35.96 | 2.1476 | 24 5 50.6 | 8.113 |
| 18 | 6 46 55.07 | 2.4206 | 28 10 24.8 | 1.887 | 18 | 8 36 44.62 | 2.1413 | 23 57 40.7 | 8.218 |
| 19 | 6 49 20.17 | 2.4160 | 28 8 26.8 | 2.044 | 19 | 8 38 52.91 | 2.1351 | 23 49 24.5 | 8.321 |
| 20 | 6 51 44.99 | 2.4114 | 28 6 19.5 | 2.200 | 20 | 8 41 0.83 | 2.1288 | 23 41 2.2 | 8.423 |
| 21 | 6 54 9.54 | 2.4067 | 28 4 2.8 | 2.355 | 21 | 8 43 8.37 | 2.1225 | 23 32 33.7 | 8.526 |
| 22 | 6 56 33.80 | 2.4018 | 28 1 36.8 | 2.510 | 22 | 8 45 15.53 | 2.1163 | 23 23 59.1 | 8.627 |
| 23 | 6 58 57.76 | 2.3969 | 27 59 1.6 | 2.663 | 23 | 8 47 22.32 | 2.1101 | 23 15 18.5 | 8.726 |
| 24 | 7 1 21.43 | 2.3920 | N.27 56 17.3 | 2.814 | 24 | 8 49 28.75 | 2.1040 | N.23 6 32.0 | 8.824 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 49 28.75 | 2.1040 | N.23 6 32.0 | 8.824 |
| 1 | 8 51 34.80 | 2.0978 | 22 57 39.6 | 8.922 |
| 2 | 8 53 40.48 | 2.0917 | 22 48 41.4 | 9.018 |
| 3 | 8 55 45.80 | 2.0855 | 22 39 37.4 | 9.114 |
| 4 | 8 57 50.74 | 2.0794 | 22 30 27.7 | 9.206 |
| 5 | 8 59 55.32 | 2.0734 | 22 21 12.4 | 9.301 |
| 6 | 9 1 59.55 | 2.0674 | 22 11 51.6 | 9.392 |
| 7 | 9 4 3.41 | 2.0613 | 22 2 25.3 | 9.483 |
| 8 | 9 6 6.91 | 2.0554 | 21 52 53.6 | 9.574 |
| 9 | 9 8 10.06 | 2.0495 | 21 43 16.4 | 9.664 |
| 10 | 9 10 12.85 | 2.0435 | 21 33 33.9 | 9.751 |
| 11 | 9 12 15.29 | 2.0377 | 21 23 46.3 | 9.837 |
| 12 | 9 14 17.37 | 2.0319 | 21 13 53.5 | 9.923 |
| 13 | 9 16 19.11 | 2.0261 | 21 3 55.6 | 10.007 |
| 14 | 9 18 20.50 | 2.0203 | 20 53 52.7 | 10.091 |
| 15 | 9 20 21.55 | 2.0146 | 20 43 44.7 | 10.174 |
| 16 | 9 22 22.25 | 2.0089 | 20 33 31.8 | 10.256 |
| 17 | 9 24 22.62 | 2.0033 | 20 23 14.1 | 10.335 |
| 18 | 9 26 22.65 | 1.9977 | 20 12 51.6 | 10.414 |
| 19 | 9 28 22.34 | 1.9922 | 20 2 24.4 | 10.493 |
| 20 | 9 30 21.71 | 1.9868 | 19 51 52.5 | 10.571 |
| 21 | 9 32 20.75 | 1.9813 | 19 41 15.9 | 10.648 |
| 22 | 9 34 19.46 | 1.9758 | 19 30 34.7 | 10.723 |
| 23 | 9 36 17.85 | 1.9705 | N.19 19 49.1 | 10.797 |

### MONDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 9 38 15.92 | 1.9652 | N.19 8 59.1 | 10.870 |
| 1 | 9 40 13.67 | 1.9599 | 18 58 4.7 | 10.943 |
| 2 | 9 42 11.11 | 1.9548 | 18 47 6.0 | 11.015 |
| 3 | 9 44 8.25 | 1.9497 | 18 36 2.9 | 11.087 |
| 4 | 9 46 5.08 | 1.9446 | 18 24 55.6 | 11.156 |
| 5 | 9 48 1.60 | 1.9395 | 18 13 44.2 | 11.224 |
| 6 | 9 49 57.82 | 1.9345 | 18 2 28.7 | 11.292 |
| 7 | 9 51 53.74 | 1.9296 | 17 51 9.2 | 11.359 |
| 8 | 9 53 49.37 | 1.9247 | 17 39 45.7 | 11.425 |
| 9 | 9 55 44.71 | 1.9199 | 17 28 18.2 | 11.491 |
| 10 | 9 57 39.76 | 1.9152 | 17 16 46.8 | 11.554 |
| 11 | 9 59 34.53 | 1.9105 | 17 5 11.7 | 11.617 |
| 12 | 10 1 29.02 | 1.9058 | 16 53 32.8 | 11.680 |
| 13 | 10 3 23.23 | 1.9013 | 16 41 50.1 | 11.742 |
| 14 | 10 5 17.17 | 1.8968 | 16 30 3.8 | 11.801 |
| 15 | 10 7 10.84 | 1.8923 | 16 18 14.0 | 11.860 |
| 16 | 10 9 4.24 | 1.8878 | 16 6 20.6 | 11.919 |
| 17 | 10 10 57.38 | 1.8834 | 15 54 23.7 | 11.978 |
| 18 | 10 12 50.25 | 1.8791 | 15 42 23.3 | 12.036 |
| 19 | 10 14 42.87 | 1.8749 | 15 30 19.4 | 12.091 |
| 20 | 10 16 35.24 | 1.8708 | 15 18 12.3 | 12.145 |
| 21 | 10 18 27.36 | 1.8667 | 15 6 2.0 | 12.191 |
| 22 | 10 20 19.24 | 1.8627 | 14 53 48.4 | 12.254 |
| 23 | 10 22 10.88 | 1.8586 | 14 41 31.5 | 12.307 |
| 24 | 10 24 2.27 | 1.8546 | N.14 29 11.5 | 12.359 |

### TUESDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 24 2.27 | 1.8546 | N.14 29 11.5 | 12.359 |
| 1 | 10 25 53.43 | 1.8508 | 14 16 48.4 | 12.410 |
| 2 | 10 27 44.36 | 1.8470 | 14 4 22.3 | 12.461 |
| 3 | 10 29 35.07 | 1.8433 | 13 51 53.1 | 12.510 |
| 4 | 10 31 25.55 | 1.8397 | 13 39 21.0 | 12.558 |
| 5 | 10 33 15.82 | 1.8361 | 13 26 46.1 | 12.606 |
| 6 | 10 35 5.88 | 1.8325 | 13 14 8.3 | 12.653 |
| 7 | 10 36 55.72 | 1.8290 | 13 1 27.7 | 12.699 |
| 8 | 10 38 45.36 | 1.8256 | 12 48 44.4 | 12.745 |
| 9 | 10 40 34.79 | 1.8222 | 12 35 58.3 | 12.790 |
| 10 | 10 42 24.02 | 1.8189 | 12 23 9.6 | 12.833 |
| 11 | 10 44 13.06 | 1.8157 | 12 10 18.3 | 12.877 |
| 12 | 10 46 1.91 | 1.8126 | 11 57 24.4 | 12.920 |
| 13 | 10 47 50.57 | 1.8095 | 11 44 27.9 | 12.962 |
| 14 | 10 49 39.05 | 1.8065 | 11 31 29.0 | 13.002 |
| 15 | 10 51 27.35 | 1.8035 | 11 18 27.7 | 13.042 |
| 16 | 10 53 15.47 | 1.8006 | 11 5 24.0 | 13.081 |
| 17 | 10 55 3.42 | 1.7978 | 10 52 18.0 | 13.119 |
| 18 | 10 56 51.20 | 1.7950 | 10 39 9.7 | 13.157 |
| 19 | 10 58 38.82 | 1.7923 | 10 25 59.1 | 13.194 |
| 20 | 11 0 26.28 | 1.7897 | 10 12 46.4 | 13.229 |
| 21 | 11 2 13.58 | 1.7871 | 9 59 31.6 | 13.264 |
| 22 | 11 4 0.73 | 1.7847 | 9 46 14.7 | 13.299 |
| 23 | 11 5 47.74 | 1.7823 | N. 9 32 55.7 | 13.333 |

### WEDNESDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 7 34.60 | 1.7799 | N. 9 19 34.7 | 13.367 |
| 1 | 11 9 21.32 | 1.7776 | 9 6 11.7 | 13.399 |
| 2 | 11 11 7.91 | 1.7754 | 8 52 46.8 | 13.430 |
| 3 | 11 12 54.37 | 1.7733 | 8 39 20.1 | 13.461 |
| 4 | 11 14 40.70 | 1.7712 | 8 25 51.5 | 13.492 |
| 5 | 11 16 26.91 | 1.7691 | 8 12 21.1 | 13.521 |
| 6 | 11 18 12.99 | 1.7671 | 7 58 49.0 | 13.549 |
| 7 | 11 19 58.96 | 1.7652 | 7 45 15.2 | 13.577 |
| 8 | 11 21 44.82 | 1.7635 | 7 31 39.7 | 13.606 |
| 9 | 11 23 30.58 | 1.7618 | 7 18 2.6 | 13.631 |
| 10 | 11 25 16.23 | 1.7601 | 7 4 24.0 | 13.657 |
| 11 | 11 27 1.78 | 1.7584 | 6 50 43.8 | 13.683 |
| 12 | 11 28 47.24 | 1.7569 | 6 37 2.1 | 13.708 |
| 13 | 11 30 32.61 | 1.7554 | 6 23 18.9 | 13.731 |
| 14 | 11 32 17.89 | 1.7540 | 6 9 34.4 | 13.753 |
| 15 | 11 34 3.09 | 1.7527 | 5 55 48.5 | 13.776 |
| 16 | 11 35 48.21 | 1.7514 | 5 42 1.3 | 13.797 |
| 17 | 11 37 33.25 | 1.7502 | 5 28 12.9 | 13.818 |
| 18 | 11 39 18.23 | 1.7491 | 5 14 23.2 | 13.838 |
| 19 | 11 41 3.14 | 1.7480 | 5 0 32.3 | 13.858 |
| 20 | 11 42 47.99 | 1.7469 | 4 46 40.3 | 13.876 |
| 21 | 11 44 32.78 | 1.7460 | 4 32 47.2 | 13.894 |
| 22 | 11 46 17.51 | 1.7452 | 4 18 53.0 | 13.911 |
| 23 | 11 48 2.20 | 1.7444 | 4 4 57.9 | 13.927 |
| 24 | 11 49 46.84 | 1.7437 | N. 3 51 1.8 | 13.943 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | THURSDAY 17. | | | | | SATURDAY 19. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 11 49 46.84 | 1.7437 | N. 3 51 1.8 | 13.943 | 0 | 13 13 56.04 | 1.7888 | S. 7 22 26.3 | 13.825 |
| 1 | 11 51 31.44 | 1.7430 | 3 37 4.8 | 13.958 | 1 | 13 15 43.44 | 1.7913 | 7 36 15.2 | 13.806 |
| 2 | 11 53 16.00 | 1.7424 | 3 23 6.9 | 13.973 | 2 | 13 17 31.00 | 1.7940 | 7 50 2.7 | 13.781 |
| 3 | 11 55 0.53 | 1.7418 | 3 9 8.1 | 13.987 | 3 | 13 19 18.73 | 1.7968 | 8 3 48.9 | 13.758 |
| 4 | 11 56 45.02 | 1.7413 | 2 55 8.5 | 13.999 | 4 | 13 21 6.62 | 1.7996 | 8 17 33.7 | 13.734 |
| 5 | 11 58 29 49 | 1.7410 | 2 41 8.2 | 14.011 | 5 | 13 22 54.68 | 1.8024 | 8 31 17.0 | 13.709 |
| 6 | 12 0 13.95 | 1.7407 | 2 27 7.2 | 14.022 | 6 | 13 24 42.91 | 1.8053 | 8 44 58.7 | 13.683 |
| 7 | 12 1 58.38 | 1.7404 | 2 13 5.5 | 14.033 | 7 | 13 26 31.32 | 1.8083 | 8 58 38.9 | 13.657 |
| 8 | 12 3 42.80 | 1.7403 | 1 59 3.2 | 14.043 | 8 | 13 28 19.91 | 1.8114 | 9 12 17.4 | 13.629 |
| 9 | 12 5 27.22 | 1.7402 | 1 45 0.4 | 14.052 | 9 | 13 30 8.69 | 1.8145 | 9 25 54.2 | 13.600 |
| 10 | 12 7 11.63 | 1.7402 | 1 30 57.0 | 14.061 | 10 | 13 31 57.65 | 1.8177 | 9 39 29.3 | 13.569 |
| 11 | 12 8 56.04 | 1.7402 | 1 16 53.1 | 14.069 | 11 | 13 33 46.81 | 1.8209 | 9 53 2.5 | 13.538 |
| 12 | 12 10 40.45 | 1.7403 | 1 2 48.7 | 14.077 | 12 | 13 35 36.16 | 1.8242 | 10 6 33.9 | 13.507 |
| 13 | 12 12 24.87 | 1.7404 | 0 48 43.9 | 14.083 | 13 | 13 37 25.71 | 1.8276 | 10 20 3.4 | 13.475 |
| 14 | 12 14 9.30 | 1.7407 | 0 34 38.8 | 14.088 | 14 | 13 39 15.47 | 1.8310 | 10 33 30.9 | 13.442 |
| 15 | 12 15 53.75 | 1.7410 | 0 20 33.4 | 14.093 | 15 | 13 41 5.43 | 1.8345 | 10 46 56.4 | 13.408 |
| 16 | 12 17 38.22 | 1.7413 | N. 0 6 27.7 | 14.097 | 16 | 13 42 55.61 | 1.8381 | 11 0 19.9 | 13.373 |
| 17 | 12 19 22.71 | 1.7418 | S. 0 7 38.2 | 14.100 | 17 | 13 44 46.01 | 1.8417 | 11 13 41.2 | 13.336 |
| 18 | 12 21 7.23 | 1.7423 | 0 21 44.3 | 14.102 | 18 | 13 46 36.62 | 1.8453 | 11 27 0.2 | 13.299 |
| 19 | 12 22 51.78 | 1.7428 | 0 35 50.5 | 14.104 | 19 | 13 48 27.45 | 1.8491 | 11 40 17.0 | 13.261 |
| 20 | 12 24 36.37 | 1.7436 | 0 49 56.8 | 14.106 | 20 | 13 50 18.51 | 1.8530 | 11 53 31.5 | 13.223 |
| 21 | 12 26 21.00 | 1.7442 | 1 4 3.2 | 14.107 | 21 | 13 52 9.81 | 1.8569 | 12 6 43.7 | 13.183 |
| 22 | 12 28 5.67 | 1.7449 | 1 18 9.6 | 14.106 | 22 | 13 54 1.34 | 1.8608 | 12 19 53.5 | 13.142 |
| 23 | 12 29 50.39 | 1.7457 | S. 1 32 15.9 | 14.105 | 23 | 13 55 53.11 | 1.8648 | S. 12 33 0.8 | 13.100 |
| | FRIDAY 18. | | | | | SUNDAY 20. | | | |
| 0 | 12 31 35.16 | 1.7466 | S. 1 46 22.2 | 14.103 | 0 | 13 57 45.12 | 1.8688 | S. 12 46 5.5 | 13.057 |
| 1 | 12 33 19.98 | 1.7476 | 2 0 28.3 | 14.100 | 1 | 13 59 37.37 | 1.8730 | 12 59 7.6 | 13.013 |
| 2 | 12 35 4.87 | 1.7487 | 2 14 34.2 | 14.097 | 2 | 14 1 29.87 | 1.8772 | 13 12 7.1 | 12.969 |
| 3 | 12 36 49.83 | 1.7498 | 2 28 40.0 | 14.093 | 3 | 14 3 22.63 | 1.8814 | 13 25 3.9 | 12.923 |
| 4 | 12 38 34.85 | 1.7510 | 2 42 45.5 | 14.088 | 4 | 14 5 15.64 | 1.8857 | 13 37 57.9 | 12.876 |
| 5 | 12 40 19.95 | 1.7523 | 2 56 50.6 | 14.083 | 5 | 14 7 8.91 | 1.8901 | 13 50 49.0 | 12.828 |
| 6 | 12 42 5.13 | 1.7537 | 3 10 55.4 | 14.077 | 6 | 14 9 2.45 | 1.8945 | 14 3 37.3 | 12.780 |
| 7 | 12 43 50.39 | 1.7550 | 3 24 59.8 | 14.070 | 7 | 14 10 56.25 | 1.8989 | 14 16 22.6 | 12.730 |
| 8 | 12 45 35.73 | 1.7564 | 3 39 3.7 | 14.062 | 8 | 14 12 50.32 | 1.9034 | 14 29 4.9 | 12.679 |
| 9 | 12 47 21.16 | 1.7579 | 3 53 7.2 | 14.053 | 9 | 14 14 44.66 | 1.9080 | 14 41 44.1 | 12.628 |
| 10 | 12 49 6.68 | 1.7595 | 4 7 10.1 | 14.043 | 10 | 14 16 39.28 | 1.9127 | 14 54 20.2 | 12.575 |
| 11 | 12 50 52.30 | 1.7612 | 4 21 12.4 | 14.033 | 11 | 14 18 34.18 | 1.9173 | 15 6 53.1 | 12.521 |
| 12 | 12 52 38.02 | 1.7629 | 4 35 14.1 | 14.022 | 12 | 14 20 29.36 | 1.9220 | 15 19 22.7 | 12.466 |
| 13 | 12 54 23.84 | 1.7647 | 4 49 15.1 | 14.010 | 13 | 14 22 24.82 | 1.9269 | 15 31 49.0 | 12.410 |
| 14 | 12 56 9.78 | 1.7666 | 5 3 15.3 | 13.998 | 14 | 14 24 20.58 | 1.9318 | 15 44 11.9 | 12.353 |
| 15 | 12 57 55.83 | 1.7685 | 5 17 14.8 | 13.984 | 15 | 14 26 16.63 | 1.9367 | 15 56 31.3 | 12.296 |
| 16 | 12 59 42.00 | 1.7705 | 5 31 13.4 | 13.969 | 16 | 14 28 12.98 | 1.9417 | 16 8 47.2 | 12.236 |
| 17 | 13 1 28.29 | 1.7725 | 5 45 11.1 | 13.954 | 17 | 14 30 9.63 | 1.9467 | 16 20 59.6 | 12.176 |
| 18 | 13 3 14.70 | 1.7746 | 5 59 7.9 | 13.938 | 18 | 14 32 6.58 | 1.9517 | 16 33 8.3 | 12.114 |
| 19 | 13 5 1.24 | 1.7768 | 6 13 3.7 | 13.922 | 19 | 14 34 3.83 | 1.9568 | 16 45 13.3 | 12.052 |
| 20 | 13 6 47.92 | 1.7791 | 6 26 58.5 | 13.904 | 20 | 14 36 1.39 | 1.9620 | 16 57 14.5 | 11.988 |
| 21 | 13 8 34.73 | 1.7814 | 6 40 52.2 | 13.886 | 21 | 14 37 59.27 | 1.9672 | 17 9 11.8 | 11.923 |
| 22 | 13 10 21.68 | 1.7838 | 6 54 44.8 | 13.867 | 22 | 14 39 57.46 | 1.9725 | 17 21 5.2 | 11.856 |
| 23 | 13 12 8.78 | 1.7863 | 7 8 36.2 | 13.846 | 23 | 14 41 55.97 | 1.9777 | 17 32 54.7 | 11.791 |
| 24 | 13 13 56.04 | 1.7888 | S. 7 22 26.3 | 13.825 | 24 | 14 43 54.79 | 1.9830 | S. 17 44 40.1 | 11.723 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 21. | | | | | WEDNESDAY 23. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 43 54.79 | 1.9830 | S.17 44 40.1 | 11.723 | 0 | 16 25 51.13 | 2.2691 | S.25 26 36.1 | 7.061 |
| 1 | 14 45 53.93 | 1.9884 | 17 56 21.4 | 11.653 | 1 | 16 28 7.45 | 2.2749 | 25 33 36.0 | 6.934 |
| 2 | 14 47 53.40 | 1.9940 | 18 7 58.5 | 11.583 | 2 | 16 30 24.12 | 2.2808 | 25 40 28.2 | 6.805 |
| 3 | 14 49 53.21 | 1.9996 | 18 19 31.4 | 11.512 | 3 | 16 32 41.15 | 2.2866 | 25 47 12.6 | 6.676 |
| 4 | 14 51 53 35 | 2.0051 | 18 30 59.9 | 11.439 | 4 | 16 34 58.62 | 2.2924 | 25 53 49.3 | 6.546 |
| 5 | 14 53 53.82 | 2.0106 | 18 42 24.0 | 11.365 | 5 | 16 37 16.23 | 2.2981 | 26 0 18.1 | 6.414 |
| 6 | 14 55 54.62 | 2.0161 | 18 53 43.7 | 11.290 | 6 | 16 39 34.29 | 2.3038 | 26 6 39.0 | 6.282 |
| 7 | 14 57 55.75 | 2.0217 | 19 4 58.8 | 11.214 | 7 | 16 41 52 69 | 2.3094 | 26 12 51.9 | 6.148 |
| 8 | 14 59 57.22 | 2.0273 | 19 16 9.3 | 11.137 | 8 | 16 44 11.42 | 2.3150 | 26 18 56.7 | 6.013 |
| 9 | 15 1 59.04 | 2.0331 | 19 27 15.2 | 11.059 | 9 | 16 46 30.49 | 2.3206 | 26 24 53.5 | 5.878 |
| 10 | 15 4 1.20 | 2.0389 | 19 38 16.4 | 10.980 | 10 | 16 48 49.89 | 2.3261 | 26 30 42.1 | 5.741 |
| 11 | 15 6 3.71 | 2.0447 | 19 49 12.8 | 10.899 | 11 | 16 51 9.62 | 2.3315 | 26 36 22.4 | 5.602 |
| 12 | 15 8 6.57 | 2.0505 | 20 0 4.3 | 10.818 | 12 | 16 53 29.67 | 2.3368 | 26 41 54.3 | 5.463 |
| 13 | 15 10 9.77 | 2.0564 | 20 10 50.9 | 10.734 | 13 | 16 55 50.04 | 2.3421 | 26 47 17.9 | 5.323 |
| 14 | 15 12 13.33 | 2.0623 | 20 21 32.4 | 10.648 | 14 | 16 58 10.73 | 2.3474 | 26 52 33.0 | 5.181 |
| 15 | 15 14 17.24 | 2.0682 | 20 32 8.8 | 10.563 | 15 | 17 0 31.73 | 2.3526 | 26 57 39.6 | 5.038 |
| 16 | 15 16 21.51 | 2.0742 | 20 42 40.0 | 10.477 | 16 | 17 2 53.04 | 2.3577 | 27 2 37.6 | 4.895 |
| 17 | 15 18 26.14 | 2.0801 | 20 53 6.0 | 10.389 | 17 | 17 5 14.65 | 2.3627 | 27 7 27.0 | 4.751 |
| 18 | 15 20 31.12 | 2.0861 | 21 3 26.7 | 10.300 | 18 | 17 7 36.57 | 2.3677 | 27 12 7.7 | 4.606 |
| 19 | 15 22 36.47 | 2.0921 | 21 13 42.0 | 10.210 | 19 | 17 9 58.78 | 2.3726 | 27 16 39.7 | 4.459 |
| 20 | 15 24 42.18 | 2.0981 | 21 23 51.9 | 10.118 | 20 | 17 12 21.28 | 2.3774 | 27 21 2.8 | 4.311 |
| 21 | 15 26 48.24 | 2.1041 | 21 33 56.2 | 10.025 | 21 | 17 14 44.07 | 2.3822 | 27 25 17.1 | 4.163 |
| 22 | 15 28 54.67 | 2.1102 | 21 43 54.9 | 9.932 | 22 | 17 17 7.14 | 2.3868 | 27 29 22.4 | 4.014 |
| 23 | 15 31 1.47 | 2.1163 | S.21 53 48.0 | 9.837 | 23 | 17 19 30.49 | 2.3914 | S.27 33 18.8 | 3.864 |
| | TUESDAY 22. | | | | | THURSDAY 24. | | | |
| 0 | 15 33 8.63 | 2.1224 | S.22 3 35.3 | 9.740 | 0 | 17 21 54.11 | 2.3959 | S.27 37 6.1 | 3.712 |
| 1 | 15 35 16.16 | 2.1286 | 22 13 16.8 | 9.642 | 1 | 17 24 18.00 | 2.4003 | 27 40 44.3 | 3.560 |
| 2 | 15 37 24.06 | 2.1348 | 22 22 52.4 | 9.543 | 2 | 17 26 42.15 | 2.4046 | 27 44 13.3 | 3.407 |
| 3 | 15 39 32.33 | 2.1409 | 22 32 22.0 | 9.443 | 3 | 17 29 6.55 | 2.4088 | 27 47 33.2 | 3.253 |
| 4 | 15 41 40.97 | 2.1471 | 22 41 45.6 | 9.342 | 4 | 17 31 31.20 | 2.4129 | 27 50 43.8 | 3.098 |
| 5 | 15 43 49.98 | 2.1532 | 22 51 3.1 | 9.240 | 5 | 17 33 56.10 | 2.4169 | 27 53 45.0 | 2.943 |
| 6 | 15 45 59 35 | 2.1593 | 23 0 14.4 | 9.136 | 6 | 17 36 21.23 | 2.4208 | 27 56 36.9 | 2.786 |
| 7 | 15 48 9.09 | 2.1655 | 23 9 19.4 | 9.031 | 7 | 17 38 46.59 | 2.4246 | 27 59 19.4 | 2.629 |
| 8 | 15 50 19.21 | 2.1717 | 23 18 18.1 | 8.925 | 8 | 17 41 12.18 | 2.4284 | 28 1 52.4 | 2.472 |
| 9 | 15 52 29.70 | 2.1779 | 23 27 10.4 | 8.818 | 9 | 17 43 38.00 | 2.4321 | 28 4 16.0 | 2.313 |
| 10 | 15 54 40.56 | 2.1841 | 23 35 56.2 | 8.709 | 10 | 17 46 4.03 | 2.4356 | 28 6 30.0 | 2.153 |
| 11 | 15 56 51.79 | 2.1903 | 23 44 35.5 | 8.599 | 11 | 17 48 30.27 | 2.4390 | 28 8 34.4 | 1.993 |
| 12 | 15 59 3.39 | 2.1964 | 23 53 8.1 | 8.488 | 12 | 17 50 56.71 | 2.4423 | 28 10 29.2 | 1.832 |
| 13 | 16 1 15.36 | 2.2026 | 24 1 34.0 | 8.376 | 13 | 17 53 23.35 | 2.4455 | 28 12 14.3 | 1.671 |
| 14 | 16 3 27.70 | 2.2087 | 24 9 53.2 | 8.263 | 14 | 17 55 50.17 | 2.4486 | 28 13 49.7 | 1.509 |
| 15 | 16 5 40.40 | 2.2148 | 24 18 5.5 | 8.148 | 15 | 17 58 17.17 | 2.4515 | 28 15 15.4 | 1.347 |
| 16 | 16 7 53.47 | 2.2209 | 24 26 10.9 | 8.032 | 16 | 18 0 44.35 | 2.4544 | 28 16 31.3 | 1.183 |
| 17 | 16 10 6.91 | 2.2270 | 24 34 9.3 | 7.914 | 17 | 18 3 11.70 | 2.4572 | 28 17 37.4 | 1.019 |
| 18 | 16 12 20.71 | 2.2331 | 24 42 0.6 | 7.796 | 18 | 18 5 39.21 | 2.4598 | 28 18 33.6 | 0.854 |
| 19 | 16 14 34.88 | 2.2392 | 24 49 44.8 | 7.677 | 19 | 18 8 6.88 | 2.4623 | 28 19 19.9 | 0.689 |
| 20 | 16 16 49.41 | 2.2452 | 24 57 21.8 | 7.556 | 20 | 18 10 34.69 | 2.4648 | 28 19 56.3 | 0.524 |
| 21 | 16 19 4.30 | 2.2512 | 25 4 51.5 | 7.433 | 21 | 18 13 2.65 | 2.4671 | 28 20 22.8 | 0.359 |
| 22 | 16 21 19.55 | 2.2572 | 25 12 13.8 | 7.310 | 22 | 18 15 30.74 | 2.4693 | 28 20 39.3 | 0.192 |
| 23 | 16 23 35.16 | 2.2632 | 25 19 28.7 | 7.186 | 23 | 18 17 58.96 | 2.4713 | 28 20 45.8 | 0.025 |
| 24 | 16 25 51.13 | 2.2691 | S.25 26 36.1 | 7.061 | 24 | 18 20 27.30 | 2.4733 | S.28 20 42.3 | 0.142 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### FRIDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 20 27.30 | 2.4733 | S.28 20 42.3 | 0.142 |
| 1 | 18 22 55.75 | 2.4751 | 28 20 28.8 | 0.309 |
| 2 | 18 25 24.31 | 2.4768 | 28 20 5.2 | 0.477 |
| 3 | 18 27 52.97 | 2.4784 | 28 19 31.5 | 0.646 |
| 4 | 18 30 21.72 | 2.4798 | 28 18 47.7 | 0.815 |
| 5 | 18 32 50.55 | 2.4811 | 28 17 53.7 | 0.984 |
| 6 | 18 35 19.45 | 2.4823 | 28 16 49.6 | 1.153 |
| 7 | 18 37 48.43 | 2.4835 | 28 15 35.3 | 1.323 |
| 8 | 18 40 17.47 | 2.4844 | 28 14 10.9 | 1.492 |
| 9 | 18 42 46.56 | 2.4852 | 28 12 36.3 | 1.662 |
| 10 | 18 45 15.70 | 2.4859 | 28 10 51.5 | 1.832 |
| 11 | 18 47 44.87 | 2.4865 | 28 8 56.5 | 2.002 |
| 12 | 18 50 14.08 | 2.4871 | 28 6 51.3 | 2.172 |
| 13 | 18 52 43.32 | 2.4874 | 28 4 35.9 | 2.342 |
| 14 | 18 55 12.57 | 2.4876 | 28 2 10.3 | 2.513 |
| 15 | 18 57 41.83 | 2.4978 | 27 59 34.4 | 2.683 |
| 16 | 19 0 11.10 | 2.4878 | 27 56 48.3 | 2.853 |
| 17 | 19 2 40.36 | 2.4876 | 27 53 52.1 | 3.022 |
| 18 | 19 5 9.61 | 2.4873 | 27 50 45.7 | 3.192 |
| 19 | 19 7 38.84 | 2.4869 | 27 47 29.1 | 3.362 |
| 20 | 19 10 8.05 | 2.4865 | 27 44 2.3 | 3.532 |
| 21 | 19 12 37.23 | 2.4860 | 27 40 25.3 | 3.702 |
| 22 | 19 15 6.37 | 2.4853 | 27 36 38.1 | 3.872 |
| 23 | 19 17 35.46 | 2.4845 | S.27 32 40.7 | 4.042 |

#### SATURDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 20 4.51 | 2.4837 | S.27 28 33.1 | 4.211 |
| 1 | 19 22 33.50 | 2.4826 | 27 24 15.4 | 4.379 |
| 2 | 19 25 2.42 | 2.4814 | 27 19 47.6 | 4.548 |
| 3 | 19 27 31.26 | 2.4801 | 27 15 9.7 | 4.716 |
| 4 | 19 30 0.03 | 2.4788 | 27 10 21.7 | 4.884 |
| 5 | 19 32 28.71 | 2.4773 | 27 5 23.6 | 5.052 |
| 6 | 19 34 57.31 | 2.4758 | 27 0 15.4 | 5.220 |
| 7 | 19 37 25.81 | 2.4741 | 26 54 57.2 | 5.386 |
| 8 | 19 39 54.20 | 2.4723 | 26 49 29.1 | 5.551 |
| 9 | 19 42 22.49 | 2.4705 | 26 43 51.1 | 5.717 |
| 10 | 19 44 50.67 | 2.4686 | 26 38 3.1 | 5.883 |
| 11 | 19 47 18.72 | 2.4665 | 26 32 5.2 | 6.048 |
| 12 | 19 49 46.65 | 2.4644 | 26 25 57.4 | 6.213 |
| 13 | 19 52 14.45 | 2.4622 | 26 19 39.7 | 6.377 |
| 14 | 19 54 42.11 | 2.4599 | 26 13 12.2 | 6.540 |
| 15 | 19 57 9.64 | 2.4576 | 26 6 34.9 | 6.703 |
| 16 | 19 59 37.02 | 2.4550 | 25 59 47.9 | 6.865 |
| 17 | 20 2 4.24 | 2.4524 | 25 52 51.1 | 7.027 |
| 18 | 20 4 31.31 | 2.4498 | 25 45 44.7 | 7.187 |
| 19 | 20 6 58.22 | 2.4471 | 25 38 28.7 | 7.347 |
| 20 | 20 9 24.96 | 2.4444 | 25 31 3.1 | 7.507 |
| 21 | 20 11 51.54 | 2.4416 | 25 23 27.9 | 7.666 |
| 22 | 20 14 17.95 | 2.4387 | 25 15 43.2 | 7.823 |
| 23 | 20 16 44.18 | 2.4356 | 25 7 49.1 | 7.980 |
| 24 | 20 19 10.22 | 2.4325 | S.24 59 45.6 | 8.137 |

#### SUNDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 19 10.22 | 2.4325 | S.24 59 45.6 | 8.137 |
| 1 | 20 21 36.08 | 2.4294 | 24 51 32.7 | 8.293 |
| 2 | 20 24 1.75 | 2.4263 | 24 43 10.5 | 8.447 |
| 3 | 20 26 27.23 | 2.4230 | 24 34 39.1 | 8.600 |
| 4 | 20 28 52.51 | 2.4197 | 24 25 58.5 | 8.753 |
| 5 | 20 31 17.59 | 2.4163 | 24 17 8.7 | 8.906 |
| 6 | 20 33 42.47 | 2.4129 | 24 8 9.7 | 9.058 |
| 7 | 20 36 7.14 | 2.4095 | 23 59 1.7 | 9.208 |
| 8 | 20 38 31.61 | 2.4061 | 23 49 44.8 | 9.357 |
| 9 | 20 40 55.87 | 2.4026 | 23 40 18.9 | 9.506 |
| 10 | 20 43 19.92 | 2.3990 | 23 30 44.1 | 9.653 |
| 11 | 20 45 43.75 | 2.3953 | 23 21 0.5 | 9.799 |
| 12 | 20 48 7.36 | 2.3917 | 23 11 8.2 | 9.944 |
| 13 | 20 50 30.75 | 2.3880 | 23 1 7.2 | 10.089 |
| 14 | 20 52 53.92 | 2.3844 | 22 50 57.6 | 10.233 |
| 15 | 20 55 16.88 | 2.3807 | 22 40 39.3 | 10.376 |
| 16 | 20 57 39.61 | 2.3769 | 22 30 12.5 | 10.517 |
| 17 | 21 0 2.11 | 2.3732 | 22 19 37.3 | 10.657 |
| 18 | 21 2 24.39 | 2.3694 | 22 8 53.7 | 10.796 |
| 19 | 21 4 46.44 | 2.3656 | 21 58 1.8 | 10.934 |
| 20 | 21 7 8.26 | 2.3617 | 21 47 1.7 | 11.071 |
| 21 | 21 9 29.85 | 2.3579 | 21 35 53.3 | 11.207 |
| 22 | 21 11 51.21 | 2.3541 | 21 24 36.8 | 11.342 |
| 23 | 21 14 12.34 | 2.3502 | S.21 13 12.3 | 11.475 |

#### MONDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 21 16 33.23 | 2.3462 | S.21 1 39.9 | 11.607 |
| 1 | 21 18 53.89 | 2.3424 | 20 49 59.5 | 11.738 |
| 2 | 21 21 14.32 | 2.3386 | 20 38 11.3 | 11.868 |
| 3 | 21 23 34.53 | 2.3348 | 20 26 15.4 | 11.996 |
| 4 | 21 25 54.50 | 2.3309 | 20 14 11.8 | 12.124 |
| 5 | 21 28 14.24 | 2.3271 | 20 2 0 5 | 12.251 |
| 6 | 21 30 33.75 | 2.3233 | 19 49 41.7 | 12.376 |
| 7 | 21 32 53.03 | 2.3194 | 19 37 15.4 | 12.499 |
| 8 | 21 35 12.08 | 2.3156 | 19 24 41.8 | 12.622 |
| 9 | 21 37 30.90 | 2.3118 | 19 12 0.8 | 12.743 |
| 10 | 21 39 49.49 | 2.3080 | 18 59 12.6 | 12.863 |
| 11 | 21 42 7.85 | 2.3040 | 18 46 17.2 | 12.983 |
| 12 | 21 44 25.99 | 2.3005 | 18 33 14.8 | 13.099 |
| 13 | 21 46 43.91 | 2.2968 | 18 20 5.4 | 13.215 |
| 14 | 21 49 1.61 | 2.2931 | 18 6 49.0 | 13.330 |
| 15 | 21 51 19.08 | 2.2894 | 17 53 25.8 | 13.443 |
| 16 | 21 53 36.33 | 2.2858 | 17 39 55.9 | 13.555 |
| 17 | 21 55 53.37 | 2.2822 | 17 26 19.3 | 13.666 |
| 18 | 21 58 10.19 | 2.2786 | 17 12 36.0 | 13.776 |
| 19 | 22 0 26.80 | 2.2750 | 16 58 46.2 | 13.883 |
| 20 | 22 2 43.19 | 2.2714 | 16 44 50.0 | 13.989 |
| 21 | 22 4 59.37 | 2.2679 | 16 30 47.5 | 14.094 |
| 22 | 22 7 15.34 | 2.2645 | 16 16 38.7 | 14.198 |
| 23 | 22 9 31.11 | 2.2611 | 16 2 23.7 | 14.302 |
| 24 | 22 11 46.67 | 2.2577 | S.15 48 2.5 | 14.403 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | TUESDAY 29. | | | | | WEDNESDAY 30. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 11 46.67 | 2.2577 | S.15 48 2.5 | 14.403 | 0 | 23 5 7.47 | 2.1936 | S. 9 36 53.6 | 16.381 |
| 1 | 22 14 2.03 | 2.2544 | 15 33 35.3 | 14.503 | 1 | 23 7 19.03 | 2.1917 | 9 20 28.8 | 16.444 |
| 2 | 22 16 17.20 | 2.2512 | 15 19 2.2 | 14.600 | 2 | 23 9 30.48 | 2.1899 | 9 4 0.3 | 16.505 |
| 3 | 22 18 32.18 | 2.2480 | 15 4 23.3 | 14.697 | 3 | 23 11 41.82 | 2.1882 | 8 47 28.2 | 16.565 |
| 4 | 22 20 46.96 | 2.2448 | 14 49 38.6 | 14.792 | 4 | 23 13 53.06 | 2.1865 | 8 30 52.5 | 16.624 |
| 5 | 22 23 1.56 | 2.2417 | 14 34 48.3 | 14.886 | 5 | 23 16 4.20 | 2.1849 | 8 14 13.3 | 16.681 |
| 6 | 22 25 15.97 | 2.2387 | 14 19 52.3 | 14.979 | 6 | 23 18 15.25 | 2.1834 | 7 57 30.8 | 16.736 |
| 7 | 22 27 30.20 | 2.2357 | 14 4 50.8 | 15.069 | 7 | 23 20 26.21 | 2.1820 | 7 40 45.0 | 16.790 |
| 8 | 22 29 44.25 | 2.2327 | 13 49 44.0 | 15.158 | 8 | 23 22 37.09 | 2.1807 | 7 23 56.0 | 16.842 |
| 9 | 22 31 58.12 | 2.2297 | 13 34 31.8 | 15.247 | 9 | 23 24 47.89 | 2.1794 | 7 7 4.0 | 16.892 |
| 10 | 22 34 11.81 | 2.2268 | 13 19 14.4 | 15.333 | 10 | 23 26 58.62 | 2.1782 | 6 50 9.0 | 16.940 |
| 11 | 22 36 25.34 | 2.2240 | 13 3 51.9 | 15.417 | 11 | 23 29 9.28 | 2.1772 | 6 33 11.2 | 16.987 |
| 12 | 22 38 38.70 | 2.2213 | 12 48 24.4 | 15.499 | 12 | 23 31 19.88 | 2.1762 | 6 16 10.6 | 17.032 |
| 13 | 22 40 51.90 | 2.2187 | 12 32 52.0 | 15.581 | 13 | 23 33 30.42 | 2.1752 | 5 59 7.4 | 17.075 |
| 14 | 22 43 4.94 | 2.2161 | 12 17 14.7 | 15.663 | 14 | 23 35 40.90 | 2.1743 | 5 42 1.6 | 17.117 |
| 15 | 22 45 17.83 | 2.2135 | 12 1 32.5 | 15.742 | 15 | 23 37 51.33 | 2.1735 | 5 24 53.3 | 17.157 |
| 16 | 22 47 30.56 | 2.2110 | 11 45 45.7 | 15.819 | 16 | 23 40 1.72 | 2.1728 | 5 7 42.7 | 17.196 |
| 17 | 22 49 43.15 | 2.2086 | 11 29 54.3 | 15.895 | 17 | 23 42 12.07 | 2.1721 | 4 50 29.8 | 17.233 |
| 18 | 22 51 55.59 | 2.2062 | 11 13 58.3 | 15.969 | 18 | 23 44 22.37 | 2.1715 | 4 33 14.7 | 17.263 |
| 19 | 22 54 7.89 | 2.2039 | 10 57 58.0 | 16.041 | 19 | 23 46 32.64 | 2.1711 | 4 15 57.6 | 17.301 |
| 20 | 22 56 20.06 | 2.2017 | 10 41 53.4 | 16.112 | 20 | 23 48 42.90 | 2.1708 | 3 58 38.6 | 17.332 |
| 21 | 22 58 32.10 | 2.1996 | 10 25 44.5 | 16.182 | 21 | 23 50 53.14 | 2.1705 | 3 41 17.8 | 17.362 |
| 22 | 23 0 44.01 | 2.1975 | 10 9 31.5 | 16.250 | 22 | 23 53 3.36 | 2.1703 | 3 23 55.2 | 17.390 |
| 23 | 23 2 55.80 | 2.1955 | 9 53 14.5 | 16.316 | 23 | 23 55 13.57 | 2.1701 | 3 6 31.0 | 17.417 |
| 24 | 23 5 7.47 | 2.1936 | S. 9 36 53.6 | 16.381 | 24 | 23 57 23.77 | 2.1700 | S. 2 49 5.2 | 17.442 |

### PHASES OF THE MOON.

| | Day. | h | m. |
|---|---|---|---|
| ● New Moon, . . . . . . . . . | 4 | 17 | 53.0 |
| ☽ First Quarter, . . . . . . . . | 11 | 16 | 52.1 |
| ○ Full Moon, . . . . . . . . . | 19 | 21 | 13.7 |
| ☾ Last Quarter, . . . . . . . . | 27 | 11 | 26.6 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . . . . . . . . | 4 | 0.6 |
| ☾ Apogee, . . . . . . . . . . . | 16 | 16.7 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | | | P. L. of Diff. | IIIh. | | | P. L. of Diff. | VIh. | | | P. L. of Diff. | IXh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 1 | Antares | W. | 71 | 29 | 7 | 2180 | 73 | 18 | 5 | 2165 | 75 | 7 | 25 | 2151 | 76 | 57 | 7 | 2137 |
| | Venus | E. | 23 | 53 | 16 | 2575 | 22 | 13 | 47 | 2563 | 20 | 34 | 1 | 2551 | 18 | 53 | 59 | 2541 |
| | Sun | E. | 52 | 35 | 23 | 2483 | 50 | 53 | 46 | 2467 | 49 | 11 | 47 | 2453 | 47 | 29 | 27 | 2438 |
| 2 | Antares | W. | 86 | 10 | 33 | 2077 | 88 | 2 | 8 | 2065 | 89 | 54 | 1 | 2055 | 91 | 46 | 10 | 2046 |
| | Sun | E. | 38 | 52 | 53 | 2378 | 37 | 8 | 39 | 2362 | 35 | 24 | 9 | 2351 | 33 | 39 | 23 | 2341 |
| 7 | Sun | W. | 31 | 19 | 3 | 2496 | 33 | 0 | 23 | 2512 | 34 | 41 | 19 | 2530 | 36 | 21 | 51 | 2548 |
| | Saturn | E. | 35 | 50 | 36 | 2276 | 34 | 4 | 0 | 2297 | 32 | 17 | 56 | 2320 | 30 | 32 | 26 | 2346 |
| | Pollux | E. | 62 | 3 | 51 | 2192 | 60 | 15 | 12 | 2208 | 58 | 26 | 57 | 2225 | 56 | 39 | 6 | 2241 |
| | Regulus | E. | 98 | 42 | 20 | 2201 | 96 | 53 | 54 | 2217 | 95 | 5 | 52 | 2233 | 93 | 18 | 14 | 2250 |
| 8 | Sun | W. | 44 | 38 | 10 | 2642 | 46 | 16 | 8 | 2662 | 47 | 53 | 39 | 2681 | 49 | 30 | 44 | 2701 |
| | Pollux | E. | 47 | 46 | 16 | 2331 | 46 | 1 | 1 | 2349 | 44 | 16 | 13 | 2368 | 42 | 31 | 52 | 2387 |
| | Regulus | E. | 84 | 26 | 25 | 2339 | 82 | 41 | 22 | 2357 | 80 | 56 | 45 | 2375 | 79 | 12 | 35 | 2394 |
| | Mars | E. | 127 | 1 | 43 | 2216 | 125 | 13 | 39 | 2234 | 123 | 26 | 2 | 2251 | 121 | 38 | 51 | 2270 |
| 9 | Sun | W. | 57 | 29 | 25 | 2806 | 59 | 3 | 49 | 2824 | 60 | 37 | 46 | 2844 | 62 | 11 | 17 | 2864 |
| | Pollux | E. | 33 | 56 | 54 | 2482 | 32 | 15 | 16 | 2502 | 30 | 34 | 5 | 2521 | 28 | 53 | 21 | 2540 |
| | Regulus | E. | 70 | 38 | 34 | 2489 | 68 | 57 | 6 | 2509 | 67 | 16 | 5 | 2528 | 65 | 35 | 31 | 2547 |
| | Mars | E. | 112 | 49 | 44 | 2362 | 111 | 5 | 15 | 2381 | 109 | 21 | 13 | 2399 | 107 | 37 | 37 | 2417 |
| 10 | Sun | W. | 69 | 52 | 32 | 2962 | 71 | 23 | 32 | 2982 | 72 | 54 | 7 | 3001 | 74 | 24 | 18 | 3020 |
| | Aldebaran | W. | 25 | 1 | 16 | 2938 | 26 | 32 | 53 | 2920 | 28 | 4 | 47 | 2909 | 29 | 36 | 55 | 2903 |
| | Regulus | E. | 57 | 19 | 12 | 2641 | 55 | 41 | 13 | 2660 | 54 | 3 | 39 | 2678 | 52 | 26 | 30 | 2696 |
| | Mars | E. | 99 | 6 | 6 | 2507 | 97 | 25 | 3 | 2525 | 95 | 44 | 25 | 2543 | 94 | 4 | 11 | 2560 |
| | Spica | E. | 111 | 19 | 54 | 2631 | 109 | 41 | 41 | 2648 | 108 | 3 | 51 | 2666 | 106 | 26 | 25 | 2683 |
| 11 | Sun | W. | 81 | 49 | 36 | 3109 | 83 | 17 | 35 | 3126 | 84 | 45 | 13 | 3143 | 86 | 12 | 31 | 3158 |
| | Aldebaran | W. | 37 | 18 | 19 | 2909 | 38 | 50 | 26 | 2916 | 40 | 22 | 25 | 2922 | 41 | 54 | 16 | 2929 |
| | Saturn | W. | 19 | 23 | 43 | 2964 | 20 | 54 | 41 | 2957 | 22 | 25 | 48 | 2953 | 23 | 57 | 0 | 2954 |
| | Regulus | E. | 44 | 26 | 40 | 2784 | 42 | 51 | 51 | 2801 | 41 | 17 | 24 | 2818 | 39 | 43 | 19 | 2834 |
| | Mars | E. | 85 | 48 | 45 | 2641 | 84 | 10 | 46 | 2656 | 82 | 33 | 7 | 2672 | 80 | 55 | 49 | 2687 |
| | Spica | E. | 98 | 24 | 55 | 2766 | 96 | 49 | 42 | 2782 | 95 | 14 | 50 | 2796 | 93 | 40 | 17 | 2811 |
| 12 | Sun | W. | 93 | 24 | 21 | 3233 | 94 | 49 | 51 | 3247 | 96 | 15 | 5 | 3260 | 97 | 40 | 3 | 3274 |
| | Aldebaran | W. | 49 | 31 | 3 | 2971 | 51 | 1 | 52 | 2979 | 52 | 32 | 31 | 2988 | 54 | 2 | 59 | 2996 |
| | Saturn | W. | 31 | 32 | 12 | 2977 | 33 | 2 | 54 | 2985 | 34 | 33 | 26 | 2992 | 36 | 3 | 49 | 2999 |
| | Regulus | E. | 31 | 58 | 12 | 2916 | 30 | 26 | 13 | 2932 | 28 | 54 | 35 | 2949 | 27 | 23 | 18 | 2965 |
| | Mars | E. | 72 | 54 | 4 | 2754 | 71 | 18 | 36 | 2767 | 69 | 43 | 25 | 2779 | 68 | 8 | 30 | 2791 |
| | Spica | E. | 85 | 52 | 14 | 2880 | 84 | 19 | 30 | 2893 | 82 | 47 | 2 | 2905 | 81 | 14 | 50 | 2917 |
| 13 | Sun | W. | 104 | 41 | 19 | 3331 | 106 | 4 | 56 | 3340 | 107 | 28 | 21 | 3350 | 108 | 51 | 34 | 3359 |
| | Aldebaran | W. | 61 | 32 | 44 | 3037 | 63 | 2 | 11 | 3044 | 64 | 31 | 29 | 3052 | 66 | 0 | 38 | 3058 |
| | Saturn | W. | 43 | 33 | 22 | 3038 | 45 | 2 | 48 | 3045 | 46 | 32 | 5 | 3052 | 48 | 1 | 13 | 3059 |
| | Pollux | W. | 17 | 14 | 0 | 2981 | 18 | 44 | 37 | 2987 | 20 | 15 | 6 | 2994 | 21 | 45 | 26 | 3001 |
| | Mars | E. | 60 | 17 | 33 | 2844 | 58 | 44 | 2 | 2853 | 57 | 10 | 43 | 2862 | 55 | 37 | 35 | 2870 |
| | Spica | E. | 73 | 37 | 23 | 2970 | 72 | 6 | 33 | 2980 | 70 | 35 | 55 | 2989 | 69 | 5 | 28 | 2997 |
| 14 | Sun | W. | 115 | 45 | 18 | 3398 | 117 | 7 | 37 | 3405 | 118 | 29 | 48 | 3411 | 119 | 51 | 52 | 3415 |
| | Aldebaran | W. | 73 | 24 | 25 | 3086 | 74 | 52 | 49 | 3093 | 76 | 21 | 7 | 3098 | 77 | 49 | 19 | 3102 |
| | Saturn | W. | 55 | 24 | 56 | 3089 | 56 | 53 | 19 | 3094 | 58 | 21 | 36 | 3099 | 59 | 49 | 47 | 3103 |
| | Pollux | W. | 29 | 14 | 57 | 3034 | 30 | 44 | 28 | 3039 | 32 | 13 | 52 | 3044 | 33 | 43 | 10 | 3050 |
| | Mars | E. | 47 | 54 | 30 | 2907 | 46 | 22 | 20 | 2913 | 44 | 50 | 18 | 2919 | 43 | 18 | 23 | 2924 |
| | Spica | E. | 61 | 35 | 39 | 3033 | 60 | 6 | 7 | 3039 | 58 | 36 | 43 | 3045 | 57 | 7 | 26 | 3051 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Antares | W. | 78 47 9 | 2124 | 80 37 32 | 2111 | 82 28 14 | 2099 | 84 19 15 | 2088 |
| | Venus | E. | 17 13 43 | 2533 | 15 33 15 | 2529 | 13 52 42 | 2527 | 12 12 6 | 2526 |
| | Sun | E. | 45 46 47 | 2424 | 44 3 47 | 2410 | 42 20 27 | 2398 | 40 36 49 | 2385 |
| 2 | Antares | W. | 93 38 33 | 2037 | 95 31 10 | 2028 | 97 24 0 | 2021 | 99 17 2 | 2014 |
| | Sun | E. | 31 54 23 | 2831 | 30 9 9 | 2822 | 28 23 42 | 2814 | 26 38 3 | 2807 |
| 7 | Sun | W. | 38 1 58 | 2566 | 39 41 40 | 2585 | 41 20 56 | 2604 | 42 59 46 | 2623 |
| | Saturn | E. | 28 47 33 | 2373 | 27 3 20 | 2403 | 25 19 49 | 2435 | 23 37 4 | 2470 |
| | Pollux | E. | 54 51 40 | 2259 | 53 4 40 | 2277 | 51 18 6 | 2294 | 49 31 58 | 2312 |
| | Regulus | E. | 91 31 1 | 2267 | 89 44 13 | 2285 | 87 57 51 | 2302 | 86 11 55 | 2320 |
| 8 | Sun | W. | 51 7 22 | 2722 | 52 43 33 | 2742 | 54 19 17 | 2763 | 55 54 34 | 2782 |
| | Pollux | E. | 40 47 58 | 2405 | 39 4 31 | 2424 | 37 21 31 | 2444 | 35 38 59 | 2463 |
| | Regulus | E. | 77 28 52 | 2414 | 75 45 37 | 2433 | 74 2 49 | 2452 | 72 20 28 | 2471 |
| | Mars | E. | 119 52 7 | 2789 | 118 5 51 | 2807 | 116 20 2 | 2826 | 114 34 40 | 2844 |
| 9 | Sun | W. | 63 44 22 | 2883 | 65 17 2 | 2903 | 66 49 17 | 2923 | 68 21 7 | 2942 |
| | Pollux | E. | 27 13 4 | 2560 | 25 33 14 | 2579 | 23 53 50 | 2599 | 22 14 53 | 2618 |
| | Regulus | E. | 63 55 23 | 2566 | 62 15 42 | 2585 | 60 36 26 | 2604 | 58 57 36 | 2623 |
| | Mars | E. | 105 54 27 | 2436 | 104 11 43 | 2454 | 102 29 25 | 2472 | 100 47 33 | 2490 |
| 10 | Sun | W. | 75 54 6 | 3039 | 77 23 31 | 3056 | 78 52 34 | 3074 | 80 21 15 | 3091 |
| | Aldebaran | W. | 31 9 10 | 2899 | 32 41 30 | 2900 | 34 13 49 | 2901 | 35 46 6 | 2905 |
| | Regulus | E. | 50 49 45 | 2714 | 49 13 24 | 2732 | 47 37 26 | 2750 | 46 1 52 | 2766 |
| | Mars | E. | 92 24 20 | 2577 | 90 44 53 | 2593 | 89 5 48 | 2610 | 87 27 6 | 2625 |
| | Spica | E. | 104 49 22 | 2700 | 103 12 42 | 2716 | 101 36 24 | 2734 | 100 0 29 | 2750 |
| 11 | Sun | W. | 87 39 30 | 3174 | 89 6 10 | 3190 | 90 32 31 | 3205 | 91 58 34 | 3220 |
| | Aldebaran | W. | 43 25 58 | 2937 | 44 57 30 | 2945 | 46 28 52 | 2954 | 48 0 3 | 2962 |
| | Saturn | W. | 25 28 11 | 2955 | 26 59 20 | 2959 | 28 30 24 | 2964 | 30 1 22 | 2970 |
| | Regulus | E. | 38 9 35 | 2851 | 36 36 13 | 2867 | 35 3 12 | 2883 | 33 30 32 | 2899 |
| | Mars | E. | 79 18 51 | 2701 | 77 42 12 | 2714 | 76 5 51 | 2729 | 74 29 49 | 2741 |
| | Spica | E. | 92 6 3 | 2825 | 90 32 8 | 2840 | 88 58 32 | 2854 | 87 25 14 | 2868 |
| 12 | Sun | W. | 99 4 46 | 3286 | 100 29 14 | 3297 | 101 53 29 | 3309 | 103 17 30 | 3319 |
| | Aldebaran | W. | 55 33 17 | 3005 | 57 3 24 | 3013 | 58 33 21 | 3022 | 60 3 7 | 3029 |
| | Saturn | W. | 37 34 3 | 3007 | 39 4 7 | 3014 | 40 34 2 | 3022 | 42 3 47 | 3030 |
| | Regulus | E. | 25 52 22 | 2983 | 24 21 48 | 3001 | 22 51 37 | 3021 | 21 21 50 | 3043 |
| | Mars | E. | 66 33 50 | 2802 | 64 59 25 | 2813 | 63 25 14 | 2824 | 61 51 17 | 2834 |
| | Spica | E. | 79 42 53 | 2928 | 78 11 10 | 2939 | 76 39 41 | 2950 | 75 8 26 | 2960 |
| 13 | Sun | W. | 110 14 38 | 3868 | 111 37 31 | 3876 | 113 0 15 | 3883 | 114 22 51 | 3891 |
| | Aldebaran | W. | 67 29 39 | 3065 | 68 58 32 | 3071 | 70 27 17 | 3078 | 71 55 54 | 3082 |
| | Saturn | W. | 49 30 13 | 3065 | 50 59 5 | 3072 | 52 27 49 | 3078 | 53 56 26 | 3083 |
| | Pollux | W. | 23 15 37 | 3009 | 24 45 39 | 3015 | 26 15 38 | 3022 | 27 45 19 | 3028 |
| | Mars | E. | 54 4 38 | 2879 | 52 31 52 | 2886 | 50 59 15 | 2894 | 49 26 48 | 2901 |
| | Spica | E. | 67 35 11 | 3005 | 66 5 4 | 3013 | 64 35 7 | 3020 | 63 5 19 | 3026 |
| 14 | Sun | W. | 121 18 51 | 3421 | 122 35 44 | 3426 | 123 57 32 | 3430 | 125 19 15 | 3434 |
| | Aldebaran | W. | 79 17 26 | 3106 | 80 45 28 | 3111 | 82 13 24 | 3114 | 83 41 16 | 3117 |
| | Saturn | W. | 61 17 53 | 3107 | 62 45 54 | 3111 | 64 13 50 | 3114 | 65 41 42 | 3117 |
| | Pollux | W. | 35 12 21 | 3054 | 36 41 27 | 3058 | 38 10 28 | 3062 | 39 39 24 | 3065 |
| | Mars | E. | 41 46 34 | 2929 | 40 14 52 | 2933 | 38 43 15 | 2938 | 37 11 44 | 2942 |
| | Spica | E. | 55 38 16 | 3056 | 54 9 12 | 3060 | 52 40 13 | 3064 | 51 11 19 | 3068 |

# GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 14 | Antares | E. | 107 28 12 | 3030 | 105 58 36 | 3035 | 104 29 7 | 3041 | 102 59 45 | 3046 |
| 15 | Sun | W. | 126 40 53 | 3438 | 128 2 27 | 3439 | 129 23 59 | 3441 | 130 45 29 | 3443 |
| | Aldebaran | W. | 85 9 5 | 3120 | 86 36 50 | 3123 | 88 4 32 | 3125 | 89 32 11 | 3127 |
| | Saturn | W. | 67 9 31 | 3120 | 68 37 16 | 3123 | 70 4 58 | 3124 | 71 32 38 | 3126 |
| | Pollux | W. | 41 8 17 | 3068 | 42 37 6 | 3070 | 44 5 52 | 3073 | 45 34 35 | 3074 |
| | Mars | E. | 35 40 18 | 2945 | 34 8 56 | 2948 | 32 37 38 | 2951 | 31 6 24 | 2953 |
| | Spica | E. | 49 42 30 | 3071 | 48 13 45 | 3073 | 46 45 3 | 3077 | 45 16 25 | 3079 |
| | Antares | E. | 95 34 18 | 3065 | 94 5 26 | 3068 | 92 36 37 | 3071 | 91 7 52 | 3073 |
| 16 | Aldebaran | W. | 96 49 57 | 3133 | 98 17 26 | 3133 | 99 44 55 | 3134 | 101 12 23 | 3135 |
| | Saturn | W. | 78 50 34 | 3130 | 80 18 7 | 3130 | 81 45 40 | 3130 | 83 13 13 | 3129 |
| | Pollux | W. | 52 57 44 | 3079 | 54 26 19 | 3079 | 55 54 54 | 3079 | 57 23 29 | 3078 |
| | Regulus | W. | 16 44 23 | 3194 | 18 10 39 | 3179 | 19 37 13 | 3165 | 21 4 4 | 3153 |
| | Mars | E. | 23 30 50 | 2961 | 21 59 48 | 2962 | 20 28 47 | 2962 | 18 57 47 | 2962 |
| | Spica | E. | 37 53 51 | 3087 | 36 25 25 | 3087 | 34 57 0 | 3088 | 33 28 36 | 3088 |
| | Antares | E. | 83 44 34 | 3078 | 82 15 58 | 3078 | 80 47 21 | 3078 | 79 18 44 | 3077 |
| 17 | Saturn | W. | 90 31 16 | 3122 | 91 58 59 | 3120 | 93 26 44 | 2118 | 94 54 32 | 3115 |
| | Pollux | W. | 64 46 44 | 3071 | 66 15 29 | 3069 | 67 44 17 | 3066 | 69 13 8 | 3064 |
| | Regulus | W. | 28 21 17 | 3114 | 29 49 10 | 3108 | 31 17 10 | 3102 | 32 45 17 | 3096 |
| | Antares | E. | 71 55 22 | 3070 | 70 26 36 | 3068 | 68 57 47 | 3066 | 67 28 56 | 3063 |
| 18 | Saturn | W. | 102 14 22 | 3100 | 103 42 32 | 3096 | 105 10 47 | 3092 | 106 39 6 | 3089 |
| | Pollux | W. | 76 38 17 | 3047 | 78 7 32 | 3043 | 79 36 51 | 3039 | 81 6 15 | 3034 |
| | Regulus | W. | 40 7 32 | 3070 | 41 36 18 | 3065 | 43 5 11 | 3059 | 44 34 11 | 3054 |
| | Antares | E. | 60 3 43 | 3046 | 58 34 27 | 3043 | 57 5 7 | 3039 | 55 35 42 | 3034 |
| 19 | Pollux | W. | 88 34 42 | 3011 | 90 4 41 | 3005 | 91 34 47 | 3001 | 93 4 59 | 2996 |
| | Regulus | W. | 52 0 49 | 3026 | 53 30 30 | 3020 | 55 0 18 | 3014 | 56 30 13 | 3008 |
| | Mars | W. | 13 4 45 | 2907 | 14 36 55 | 2902 | 16 9 11 | 2897 | 17 41 34 | 2891 |
| | Antares | E. | 48 7 14 | 3010 | 46 37 14 | 3005 | 45 7 8 | 3000 | 43 36 55 | 2996 |
| | *a* Aquilæ | E. | 98 24 34 | 3872 | 97 10 46 | 3862 | 95 56 48 | 3852 | 94 42 39 | 3843 |
| 20 | Pollux | W. | 100 37 47 | 2965 | 102 8 43 | 2960 | 103 39 46 | 2954 | 105 10 57 | 2946 |
| | Regulus | W. | 64 1 43 | 2977 | 65 32 24 | 2970 | 67 3 14 | 2764 | 68 34 12 | 2958 |
| | Mars | W. | 25 25 16 | 2863 | 26 58 22 | 2858 | 28 31 35 | 2852 | 30 4 56 | 2846 |
| | Antares | E. | 36 4 9 | 2966 | 34 33 14 | 2960 | 33 2 11 | 2954 | 31 31 0 | 2948 |
| | *a* Aquilæ | E. | 88 29 52 | 3810 | 87 15 0 | 3805 | 86 0 3 | 3802 | 84 45 3 | 3800 |
| 21 | Regulus | W. | 76 11 8 | 2924 | 77 42 57 | 2916 | 79 14 56 | 2908 | 80 47 4 | 2901 |
| | Mars | W. | 37 53 35 | 2815 | 39 27 43 | 2809 | 41 1 59 | 2802 | 42 36 24 | 2796 |
| | Spica | W. | 22 8 44 | 2935 | 23 40 19 | 2926 | 25 12 5 | 2916 | 26 44 3 | 2907 |
| | *a* Aquilæ | E. | 78 29 51 | 3804 | 77 14 53 | 3808 | 75 59 59 | 3814 | 74 45 11 | 3820 |
| 22 | Regulus | W. | 88 30 3 | 2865 | 90 3 7 | 2856 | 91 36 22 | 2848 | 93 9 47 | 2841 |
| | Mars | W. | 50 30 39 | 2762 | 52 5 57 | 2754 | 53 41 25 | 2747 | 55 17 2 | 2741 |
| | Spica | W. | 34 26 42 | 2864 | 35 59 47 | 2856 | 37 33 2 | 2848 | 39 6 28 | 2838 |
| | *a* Aquilæ | E. | 68 33 16 | 3874 | 67 19 30 | 3890 | 66 6 0 | 3908 | 64 52 48 | 3927 |
| | Fomalhaut | E. | 94 8 7 | 3046 | 92 38 51 | 3038 | 91 9 25 | 3030 | 89 39 50 | 3022 |
| | Jupiter | E. | 120 9 56 | 2935 | 118 38 21 | 2925 | 117 6 34 | 2917 | 115 34 37 | 2908 |
| 23 | Regulus | W. | 100 59 26 | 2800 | 102 33 54 | 2792 | 104 8 33 | 2783 | 105 43 23 | 2774 |
| | Mars | W. | 63 17 33 | 2702 | 64 54 10 | 2694 | 66 30 58 | 2687 | 68 7 56 | 2678 |
| | Spica | W. | 46 56 28 | 2796 | 48 31 2 | 2786 | 50 5 47 | 2778 | 51 40 44 | 2769 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 14 | Antares | E. | 101 30 29 | 3051 | 100 1 19 | 3055 | 98 32 14 | 3059 | 97 3 14 | 3062 |
| 15 | Sun | W. | 132 6 57 | 3445 | 133 28 23 | 3446 | 134 49 48 | 3446 | 136 11 12 | 3447 |
| | Aldebaran | W. | 90 59 48 | 3129 | 92 27 23 | 3130 | 93 54 56 | 3132 | 95 22 27 | 3133 |
| | Saturn | W. | 73 0 16 | 3128 | 74 27 52 | 3129 | 75 55 27 | 3129 | 77 23 1 | 3130 |
| | Pollux | W. | 47 3 16 | 3076 | 48 31 55 | 3078 | 50 0 32 | 3078 | 51 29 8 | 3078 |
| | Mars | E. | 29 35 12 | 2955 | 28 4 3 | 2958 | 26 32 57 | 2959 | 25 1 53 | 2960 |
| | Spica | E. | 43 47 50 | 3081 | 42 19 18 | 3082 | 40 50 47 | 3084 | 39 22 18 | 3086 |
| | Antares | E. | 89 39 9 | 3074 | 88 10 28 | 3076 | 86 41 49 | 3077 | 85 13 11 | 3078 |
| 16 | Aldebaran | W. | 102 39 52 | 3133 | 104 7 21 | 3133 | 105 34 50 | 3133 | 107 2 20 | 3132 |
| | Saturn | W. | 84 40 47 | 3129 | 86 8 22 | 3128 | 87 35 58 | 3126 | 89 3 36 | 3124 |
| | Pollux | W. | 58 52 5 | 3078 | 60 20 42 | 3076 | 61 49 21 | 3075 | 63 18 1 | 3073 |
| | Regulus | W. | 22 31 10 | 3143 | 23 58 27 | 3134 | 25 25 55 | 3127 | 26 53 32 | 3120 |
| | Mars | E. | 17 26 47 | 2962 | 15 55 47 | 2962 | 14 24 47 | 2962 | 12 53 46 | 2962 |
| | Spica | E. | 32 0 12 | 3088 | 30 31 48 | 3088 | 29 3 24 | 3088 | 27 35 0 | 3088 |
| | Antares | E. | 77 50 6 | 3077 | 76 21 28 | 3075 | 74 52 48 | 3073 | 73 24 6 | 3072 |
| 17 | Saturn | W. | 96 22 23 | 3113 | 97 50 17 | 3110 | 99 18 15 | 3106 | 100 46 17 | 3104 |
| | Pollux | W. | 70 42 2 | 3061 | 72 10 59 | 3057 | 73 40 1 | 3054 | 75 9 7 | 3051 |
| | Regulus | W. | 34 13 31 | 3091 | 35 41 52 | 3086 | 37 10 19 | 3081 | 38 38 52 | 3076 |
| | Antares | E. | 66 0 1 | 3060 | 64 31 2 | 3057 | 63 2 0 | 3054 | 61 32 54 | 3050 |
| 18 | Saturn | W. | 108 7 29 | 3085 | 109 35 57 | 3080 | 111 4 31 | 3076 | 112 33 10 | 3072 |
| | Pollux | W. | 82 35 45 | 3030 | 84 5 21 | 3026 | 85 35 2 | 3021 | 87 4 49 | 3016 |
| | Regulus | W. | 46 3 17 | 3048 | 47 32 30 | 3043 | 49 1 49 | 3038 | 50 31 15 | 3031 |
| | Antares | E. | 54 6 12 | 3030 | 52 36 36 | 3026 | 51 6 55 | 3021 | 49 37 8 | 3015 |
| 19 | Pollux | W. | 94 35 18 | 2989 | 96 5 44 | 2983 | 97 36 18 | 2977 | 99 6 59 | 2972 |
| | Regulus | W. | 58 0 16 | 3002 | 59 30 26 | 2996 | 61 0 44 | 2989 | 62 31 10 | 2984 |
| | Mars | W. | 19 14 4 | 2886 | 20 46 41 | 2880 | 22 19 25 | 2874 | 23 52 17 | 2869 |
| | Antares | E. | 42 6 36 | 2989 | 40 36 10 | 2984 | 39 5 37 | 2978 | 37 34 57 | 2972 |
| | α Aquilæ | E. | 93 28 21 | 3834 | 92 13 54 | 3827 | 90 59 20 | 3820 | 89 44 39 | 3816 |
| 20 | Pollux | W. | 106 42 17 | 2940 | 108 13 45 | 2934 | 109 45 21 | 2927 | 111 17 5 | 2921 |
| | Regulus | W. | 70 5 18 | 2950 | 71 36 33 | 2944 | 73 7 56 | 2937 | 74 39 28 | 2931 |
| | Mars | W. | 31 38 24 | 2840 | 33 12 0 | 2834 | 34 45 44 | 2828 | 36 19 35 | 2821 |
| | Antares | E. | 29 59 42 | 2942 | 28 28 16 | 2935 | 26 56 42 | 2928 | 25 24 59 | 2923 |
| | α Aquilæ | E. | 83 30 1 | 3799 | 82 14 58 | 3799 | 80 59 55 | 3799 | 79 44 52 | 3801 |
| 21 | Regulus | W. | 82 19 21 | 2894 | 83 51 47 | 2887 | 85 24 23 | 2880 | 86 57 8 | 2872 |
| | Mars | W. | 44 10 57 | 2789 | 45 45 39 | 2782 | 47 20 30 | 2775 | 48 55 30 | 2768 |
| | Spica | W. | 28 16 13 | 2898 | 29 48 34 | 2890 | 31 21 6 | 2881 | 32 53 49 | 2873 |
| | α Aquilæ | E. | 73 30 29 | 3827 | 72 15 55 | 3837 | 71 1 31 | 3847 | 69 47 17 | 3858 |
| 22 | Regulus | W. | 94 43 22 | 2833 | 96 17 7 | 2825 | 97 51 3 | 2817 | 99 25 9 | 2808 |
| | Mars | W. | 56 52 48 | 2733 | 58 28 44 | 2725 | 60 4 50 | 2718 | 61 41 6 | 2710 |
| | Spica | W. | 40 40 6 | 2830 | 42 13 55 | 2821 | 43 47 55 | 2813 | 45 22 6 | 2805 |
| | α Aquilæ | E. | 63 39 56 | 3950 | 62 27 27 | 3975 | 61 15 23 | 4004 | 60 3 47 | 4034 |
| | Fomalhaut | E. | 88 10 5 | 3014 | 86 40 10 | 3007 | 85 10 6 | 3000 | 83 39 52 | 2993 |
| | Jupiter | E. | 114 2 28 | 2900 | 112 30 9 | 2891 | 110 57 38 | 2883 | 109 24 57 | 2873 |
| 23 | Regulus | W. | 107 18 25 | 2766 | 108 53 38 | 2757 | 110 29 2 | 2748 | 112 4 38 | 2739 |
| | Mars | W. | 69 45 5 | 2670 | 71 22 25 | 2661 | 72 59 57 | 2652 | 74 37 41 | 2644 |
| | Spica | W. | 53 15 53 | 2760 | 54 51 14 | 2750 | 56 26 47 | 2741 | 58 2 33 | 2732 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 23 | α Aquilæ | E. | 58 52 41 | 4068 | 57 42 8 | 4105 | 56 32 11 | 4145 | 55 22 53 | 4191 |
| | Fomalhaut | E. | 82 9 30 | 2985 | 80 38 59 | 2978 | 79 8 19 | 2972 | 77 37 31 | 2965 |
| | Jupiter | E. | 107 52 4 | 2865 | 106 19 0 | 2856 | 104 45 45 | 2848 | 103 12 19 | 2838 |
| | Venus | E. | 121 0 42 | 3229 | 119 35 7 | 3220 | 118 9 21 | 3210 | 116 43 24 | 3200 |
| 24 | Mars | W. | 76 15 36 | 2635 | 77 53 43 | 2626 | 79 32 2 | 2618 | 81 10 53 | 2608 |
| | Spica | W. | 59 38 31 | 2722 | 61 14 42 | 2712 | 62 51 6 | 2702 | 64 27 43 | 2692 |
| | Antares | W. | 13 44 35 | 2726 | 15 20 40 | 2716 | 16 56 59 | 2704 | 18 33 33 | 2694 |
| | Fomalhaut | E. | 70 1 39 | 2939 | 68 30 9 | 2934 | 66 58 33 | 2929 | 65 26 51 | 2924 |
| | α Pegasi | E. | 91 24 40 | 3052 | 89 55 32 | 3043 | 88 26 12 | 3034 | 86 56 41 | 3026 |
| | Jupiter | E. | 95 22 10 | 2792 | 93 47 32 | 2782 | 92 12 40 | 2772 | 90 37 36 | 2762 |
| | Venus | E. | 109 30 40 | 3149 | 108 3 30 | 3139 | 106 36 8 | 3128 | 105 8 32 | 3118 |
| | Sun | E. | 132 45 45 | 3058 | 131 16 44 | 3048 | 129 47 31 | 3038 | 128 18 5 | 3027 |
| 25 | Mars | W. | 89 26 20 | 2561 | 91 6 9 | 2551 | 92 46 12 | 2540 | 94 26 29 | 2530 |
| | Spica | W. | 72 34 10 | 2641 | 74 12 9 | 2630 | 75 50 23 | 2620 | 77 28 51 | 2609 |
| | Antares | W. | 26 39 59 | 2640 | 28 17 59 | 2629 | 29 56 14 | 2618 | 31 34 45 | 2607 |
| | Fomalhaut | E. | 57 47 21 | 2915 | 56 15 21 | 2916 | 54 43 22 | 2916 | 53 11 24 | 2919 |
| | α Pegasi | E. | 79 26 31 | 2987 | 77 56 2 | 2981 | 76 25 24 | 2975 | 74 54 40 | 2969 |
| | Jupiter | E. | 82 38 53 | 2710 | 81 2 26 | 2699 | 79 25 45 | 2688 | 77 48 50 | 2677 |
| | Venus | E. | 97 47 15 | 3061 | 96 18 18 | 3050 | 94 49 7 | 3038 | 93 19 41 | 3026 |
| | Sun | E. | 120 47 34 | 2972 | 119 16 46 | 2961 | 117 45 44 | 2949 | 116 14 27 | 2937 |
| 26 | Mars | W. | 102 51 30 | 2477 | 104 33 15 | 2467 | 106 15 15 | 2455 | 107 57 31 | 2445 |
| | Spica | W. | 85 45 0 | 2552 | 87 25 1 | 2540 | 89 5 18 | 2529 | 90 45 51 | 2517 |
| | Antares | W. | 39 51 7 | 2551 | 41 31 10 | 2538 | 43 11 30 | 2527 | 44 52 6 | 2515 |
| | Fomalhaut | E. | 45 32 54 | 2954 | 44 1 44 | 2968 | 42 30 51 | 2985 | 41 0 19 | 3005 |
| | α Pegasi | E. | 67 19 32 | 2953 | 65 48 20 | 2952 | 64 17 7 | 2952 | 62 45 54 | 2954 |
| | Jupiter | E. | 69 40 24 | 2621 | 68 1 57 | 2608 | 66 23 13 | 2596 | 64 44 13 | 2584 |
| | Venus | E. | 85 48 46 | 2964 | 84 17 48 | 2951 | 82 46 34 | 2939 | 81 15 4 | 2926 |
| | Sun | E. | 108 34 16 | 2877 | 107 1 28 | 2865 | 105 28 24 | 2852 | 103 55 3 | 2838 |
| 27 | Mars | W. | 116 32 49 | 2388 | 118 16 41 | 2376 | 120 0 52 | 2364 | 121 45 17 | 2352 |
| | Spica | W. | 99 12 45 | 2457 | 100 54 59 | 2445 | 102 37 30 | 2432 | 104 20 19 | 2420 |
| | Antares | W. | 53 19 17 | 2455 | 55 1 34 | 2442 | 56 44 9 | 2429 | 58 27 2 | 2417 |
| | α Pegasi | E. | 55 10 47 | 2981 | 53 40 11 | 2993 | 52 9 50 | 3008 | 50 39 47 | 3024 |
| | Jupiter | E. | 56 25 0 | 2522 | 54 44 18 | 2510 | 53 3 19 | 2498 | 51 22 3 | 2486 |
| | Venus | E. | 73 33 26 | 2859 | 72 0 15 | 2846 | 70 26 47 | 2832 | 68 53 1 | 2819 |
| | Sun | E. | 96 4 5 | 2774 | 94 29 3 | 2760 | 92 53 43 | 2747 | 91 18 6 | 2734 |
| 28 | Antares | W. | 67 5 52 | 2355 | 68 50 32 | 2342 | 70 35 30 | 2331 | 72 20 45 | 2318 |
| | Jupiter | E. | 42 51 16 | 2422 | 41 8 13 | 2410 | 39 24 53 | 2398 | 37 41 15 | 2386 |
| | Venus | E. | 60 59 49 | 2751 | 59 24 17 | 2738 | 57 48 27 | 2725 | 56 12 20 | 2711 |
| | Sun | E. | 83 15 34 | 2667 | 81 38 10 | 2655 | 80 0 29 | 2641 | 78 22 30 | 2628 |
| 29 | Antares | W. | 81 11 26 | 2258 | 82 58 28 | 2247 | 84 45 46 | 2235 | 86 33 21 | 2225 |
| | Jupiter | E. | 28 58 45 | 2326 | 27 13 24 | 2315 | 25 27 47 | 2304 | 23 41 54 | 2295 |
| | Venus | E. | 48 7 19 | 2647 | 46 29 28 | 2635 | 44 51 20 | 2622 | 43 12 55 | 2610 |
| | Sun | E. | 70 8 9 | 2564 | 68 28 24 | 2552 | 66 48 23 | 2540 | 65 8 5 | 2528 |
| 30 | Antares | W. | 95 35 11 | 2173 | 97 24 19 | 2164 | 99 13 41 | 2155 | 101 3 17 | 2146 |
| | α Aquilæ | W. | 53 17 35 | 3646 | 54 35 20 | 3569 | 55 54 28 | 3500 | 57 14 52 | 3437 |
| | Venus | E. | 34 56 52 | 2555 | 33 16 55 | 2545 | 31 36 44 | 2535 | 29 56 20 | 2527 |
| | Sun | E. | 56 42 38 | 2474 | 55 0 48 | 2464 | 53 18 44 | 2454 | 51 36 26 | 2445 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 23 | α Aquilæ | E. | 54 14 18 | 4240 | 53 6 30 | 4296 | 51 59 34 | 4358 | 50 53 35 | 4427 |
| | Fomalhaut | E. | 76 6 35 | 2959 | 74 35 31 | 2954 | 73 4 21 | 2948 | 71 33 3 | 2943 |
| | Jupiter | E. | 101 38 41 | 2830 | 100 4 52 | 2820 | 98 30 50 | 2811 | 96 56 36 | 2801 |
| | Venus | E. | 115 17 15 | 3191 | 113 50 55 | 3180 | 112 24 22 | 3170 | 110 57 37 | 3160 |
| 24 | Mars | W. | 82 49 17 | 2599 | 84 28 13 | 2590 | 86 7 22 | 2580 | 87 46 44 | 2570 |
| | Spica | W. | 66 4 33 | 2682 | 67 41 37 | 2672 | 69 18 54 | 2662 | 70 56 25 | 2652 |
| | Antares | W. | 20 10 21 | 2683 | 21 47 24 | 2672 | 23 24 41 | 2661 | 25 2 13 | 2651 |
| | Fomalhaut | E. | 63 55 3 | 2921 | 62 23 11 | 2920 | 60 51 17 | 2917 | 59 19 20 | 2916 |
| | α Pegasi | E. | 85 26 59 | 3016 | 83 57 6 | 3009 | 82 27 4 | 3001 | 80 56 52 | 2993 |
| | Jupiter | E. | 89 2 18 | 2752 | 87 26 47 | 2742 | 85 51 3 | 2732 | 84 15 5 | 2721 |
| | Venus | E. | 103 40 44 | 3106 | 102 12 42 | 3096 | 100 44 27 | 3084 | 99 15 58 | 3073 |
| | Sun | E. | 126 48 26 | 3017 | 125 18 34 | 3005 | 123 48 28 | 2994 | 122 18 8 | 2983 |
| 25 | Mars | W. | 96 7 0 | 2520 | 97 47 45 | 2510 | 99 28 45 | 2499 | 101 10 0 | 2488 |
| | Spica | W. | 79 7 34 | 2597 | 80 46 33 | 2587 | 82 25 46 | 2575 | 84 5 15 | 2564 |
| | Antares | W. | 33 13 31 | 2596 | 34 52 32 | 2585 | 36 31 48 | 2573 | 38 11 20 | 2562 |
| | Fomalhaut | E. | 51 39 29 | 2923 | 50 7 39 | 2927 | 48 35 55 | 2935 | 47 4 20 | 2942 |
| | α Pegasi | E. | 73 23 48 | 2964 | 71 52 50 | 2961 | 70 21 48 | 2958 | 68 50 42 | 2954 |
| | Jupiter | E. | 76 11 39 | 2666 | 74 34 13 | 2655 | 72 56 32 | 2643 | 71 18 36 | 2632 |
| | Venus | E. | 91 50 0 | 3014 | 90 20 5 | 3001 | 88 49 54 | 2989 | 87 19 28 | 2977 |
| | Sun | E. | 114 42 55 | 2925 | 113 11 8 | 2913 | 111 39 6 | 2901 | 110 6 49 | 2889 |
| 26 | Mars | W. | 109 40 2 | 2433 | 111 22 49 | 2422 | 113 5 53 | 2410 | 114 49 13 | 2399 |
| | Spica | W. | 92 26 40 | 2505 | 94 7 46 | 2493 | 95 49 9 | 2482 | 97 30 48 | 2469 |
| | Antares | W. | 46 32 59 | 2503 | 48 14 8 | 2491 | 49 55 34 | 2479 | 51 37 17 | 2467 |
| | Fomalhaut | E. | 39 30 12 | 3029 | 38 0 34 | 3060 | 36 31 35 | 3096 | 35 3 20 | 3135 |
| | α Pegasi | E. | 61 14 43 | 2956 | 59 43 35 | 2960 | 58 12 32 | 2965 | 56 41 35 | 2972 |
| | Jupiter | E. | 63 4 56 | 2572 | 61 25 22 | 2560 | 59 45 32 | 2548 | 58 5 25 | 2535 |
| | Venus | E. | 79 43 18 | 2912 | 78 11 15 | 2899 | 76 38 55 | 2887 | 75 6 19 | 2873 |
| | Sun | E. | 102 21 25 | 2825 | 100 47 30 | 2812 | 99 13 18 | 2800 | 97 38 50 | 2787 |
| 27 | Mars | W. | 123 30 1 | 2341 | 125 15 1 | 2329 | 127 0 19 | 2317 | 128 45 54 | 2306 |
| | Spica | W. | 106 3 25 | 2408 | 107 46 49 | 2396 | 109 30 30 | 2383 | 111 14 29 | 2371 |
| | Antares | W. | 60 10 12 | 2405 | 61 53 40 | 2392 | 63 37 26 | 2380 | 65 21 30 | 2367 |
| | α Pegasi | E. | 49 10 4 | 3044 | 47 40 46 | 3068 | 46 11 57 | 3096 | 44 43 43 | 3129 |
| | Jupiter | E. | 49 40 29 | 2472 | 47 58 37 | 2460 | 46 16 28 | 2448 | 44 34 1 | 2435 |
| | Venus | E. | 67 18 58 | 2805 | 65 44 37 | 2792 | 64 9 59 | 2779 | 62 35 3 | 2765 |
| | Sun | E. | 89 42 11 | 2720 | 88 5 58 | 2707 | 86 29 28 | 2694 | 84 52 40 | 2681 |
| 28 | Antares | W. | 74 6 18 | 2307 | 75 52 8 | 2294 | 77 38 16 | 2282 | 79 24 42 | 2270 |
| | Jupiter | E. | 35 57 20 | 2373 | 34 13 7 | 2362 | 32 28 37 | 2349 | 30 43 49 | 2338 |
| | Venus | E. | 54 35 55 | 2698 | 52 59 12 | 2685 | 51 22 12 | 2672 | 49 44 54 | 2659 |
| | Sun | E. | 76 44 13 | 2615 | 75 5 39 | 2602 | 73 26 46 | 2589 | 71 47 37 | 2576 |
| 29 | Antares | W. | 88 21 12 | 2214 | 90 9 19 | 2204 | 91 57 41 | 2194 | 93 46 18 | 2183 |
| | Jupiter | E. | 21 55 47 | 2285 | 20 9 25 | 2275 | 18 22 49 | 2266 | 16 35 59 | 2257 |
| | Venus | E. | 41 34 13 | 2598 | 39 55 15 | 2588 | 38 16 3 | 2576 | 36 36 35 | 2565 |
| | Sun | E. | 63 27 31 | 2517 | 61 46 41 | 2505 | 60 5 35 | 2494 | 58 24 14 | 2484 |
| 30 | Antares | W. | 102 53 6 | 2138 | 104 43 7 | 2130 | 106 33 20 | 2123 | 108 23 44 | 2116 |
| | α Aquilæ | W. | 58 36 27 | 3379 | 59 59 8 | 3325 | 61 22 51 | 3276 | 62 47 31 | 3231 |
| | Venus | E. | 28 15 45 | 2519 | 26 34 58 | 2511 | 24 54 0 | 2504 | 23 12 52 | 2497 |
| | Sun | E. | 49 53 55 | 2436 | 48 11 12 | 2429 | 46 28 18 | 2421 | 44 45 13 | 2413 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S *Apparent* Declination. | THE SUN'S Diff. for 1 hour. | THE SUN'S Semi-diameter. | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Thur. | 1 | 2 35 18.32 | 9.552 | N.15 13 15.8 | 45.11 | 15 54.01 | 66.07 | 3 4.59 | 0.304 |
| Fri. | 2 | 2 39 7.83 | 9.575 | 15 31 10.8 | 44.47 | 15 53.77 | 66.15 | 3 11.62 | 0.282 |
| Sat. | 3 | 2 42 57.88 | 9.598 | 15 48 50.5 | 43.82 | 15 53.53 | 66.23 | 3 18.11 | 0.258 |
| *Sun.* | 4 | 2 46 48.51 | 9.621 | 16 6 14.4 | 43.16 | 15 53.30 | 66.32 | 3 24.01 | 0.235 |
| Mon. | 5 | 2 50 39.71 | 9.645 | 16 23 22.5 | 42.50 | 15 53.07 | 66.40 | 3 29.36 | 0.211 |
| Tues. | 6 | 2 54 31.46 | 9.668 | 16 40 14.3 | 41.81 | 15 52.84 | 66.48 | 3 34.14 | 0.188 |
| Wed. | 7 | 2 58 23.76 | 9.692 | 16 56 49.3 | 41.11 | 15 52.62 | 66.57 | 3 38.39 | 0.165 |
| Thur. | 8 | 3 2 16.62 | 9.715 | 17 13 7.2 | 40.39 | 15 52.41 | 66.65 | 3 42.06 | 0.141 |
| Fri. | 9 | 3 6 10.04 | 9.738 | 17 29 7.9 | 39.66 | 15 52.20 | 66.74 | 3 45.19 | 0.118 |
| Sat. | 10 | 3 10 4.05 | 9.762 | 17 44 51.1 | 38.92 | 15 51.99 | 66.82 | 3 47.75 | 0.095 |
| *Sun.* | 11 | 3 13 58.60 | 9.785 | 18 0 16.4 | 38.17 | 15 51.78 | 66.91 | 3 49.76 | 0.072 |
| Mon. | 12 | 3 17 53.70 | 9.809 | 18 15 23.2 | 37.41 | 15 51.56 | 66.99 | 3 51.21 | 0.049 |
| Tues. | 13 | 3 21 49.39 | 9.832 | 18 30 12.0 | 36.64 | 15 51.36 | 67.07 | 3 52.08 | 0.025 |
| Wed. | 14 | 3 25 45.62 | 9.855 | 18 44 42.0 | 35.85 | 15 51.22 | 67.16 | 3 52.41 | 0.002 |
| Thur. | 15 | 3 29 42.41 | 9.878 | 18 58 52.8 | 35.05 | 15 51.03 | 67.24 | 3 52.17 | 0.021 |
| Fri. | 16 | 3 33 39.74 | 9.901 | 19 12 44.5 | 34.24 | 15 50.84 | 67.32 | 3 51.40 | 0.044 |
| Sat. | 17 | 3 37 37.64 | 9.924 | 19 26 16.6 | 33.42 | 15 50.65 | 67.40 | 3 50.06 | 0.067 |
| *Sun.* | 18 | 3 41 36.07 | 9.947 | 19 39 29.1 | 32.59 | 15 50.46 | 67.48 | 3 48.18 | 0.090 |
| Mon. | 19 | 3 45 35.07 | 9.969 | 19 52 21.6 | 31.76 | 15 50.28 | 67.56 | 3 45.74 | 0.113 |
| Tues. | 20 | 3 49 34.63 | 9.992 | 20 4 53.7 | 30.91 | 15 50.10 | 67.64 | 3 42.75 | 0.135 |
| Wed. | 21 | 3 53 34.71 | 10.015 | 20 17 5.4 | 30.05 | 15 49.92 | 67.71 | 3 39.24 | 0.157 |
| Thur. | 22 | 3 57 35.34 | 10.037 | 20 28 56.3 | 29.18 | 15 49.74 | 67.79 | 3 35.17 | 0.180 |
| Fri. | 23 | 4 1 36.51 | 10.059 | 20 40 26.3 | 28.31 | 15 49.57 | 67.86 | 3 30.57 | 0.202 |
| Sat. | 24 | 4 5 38.23 | 10.081 | 20 51 35.1 | 27.42 | 15 49.40 | 67.93 | 3 25.43 | 0.224 |
| *Sun.* | 25 | 4 9 40.48 | 10.103 | 21 2 22.7 | 26.53 | 15 49.23 | 68.00 | 3 19.76 | 0.246 |
| Mon. | 26 | 4 13 43.22 | 10.124 | 21 12 48.6 | 25.62 | 15 49.07 | 68.07 | 3 13.61 | 0.267 |
| Tues. | 27 | 4 17 46.44 | 10.145 | 21 22 52.6 | 24.70 | 15 48.91 | 68.13 | 3 6.94 | 0.288 |
| Wed. | 28 | 4 21 50.18 | 10.165 | 21 32 34.5 | 23.78 | 15 48.75 | 68.20 | 2 59.77 | 0.308 |
| Thur. | 29 | 4 25 54.39 | 10.185 | 21 41 54.2 | 22.85 | 15 48.59 | 68.25 | 2 52.14 | 0.328 |
| Fri. | 30 | 4 29 59.06 | 10.203 | 21 50 51.3 | 21.91 | 15 48.44 | 68.31 | 2 44.05 | 0.347 |
| Sat. | 31 | 4 34 4.19 | 10.221 | 21 59 25.7 | 20.96 | 15 48.30 | 68.37 | 2 35.51 | 0.365 |
| *Sun.* | 32 | 4 38 9.72 | 10.239 | N.22 7 37.3 | 19.99 | 15 48.16 | 68.43 | 2 26.55 | 0.383 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | Equation of Time, *to be added to Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Thur. | 1 | 2 35 18.81 | 9.552 | N.15 13 18.1 | 45.11 | 3 4.60 | 0.304 | 2 38 23.41 |
| Fri. | 2 | 2 39 8.34 | 9.575 | 15 31 13.2 | 44.47 | 3 11.63 | 0.282 | 2 42 19.97 |
| Sat. | 3 | 2 42 58.41 | 9.598 | 15 48 52.9 | 43.82 | 3 18.12 | 0.258 | 2 46 16.53 |
| *Sun.* | 4 | 2 46 49.06 | 9.621 | 16 6 16.8 | 43.16 | 3 24.02 | 0.235 | 2 50 13.08 |
| Mon. | 5 | 2 50 40.27 | 9.645 | 16 23 24.9 | 42.50 | 3 29.37 | 0.211 | 2 54 9.64 |
| Tues. | 6 | 2 54 32.04 | 9.668 | 16 40 16.7 | 41.81 | 3 34.15 | 0.188 | 2 58 6.19 |
| Wed. | 7 | 2 58 24.35 | 9.692 | 16 56 51.7 | 41.11 | 3 38.40 | 0.165 | 3 2 2.75 |
| Thur. | 8 | 3 2 17.23 | 9.715 | 17 13 9.7 | 40.39 | 3 42.07 | 0.141 | 3 5 59.30 |
| Fri. | 9 | 3 6 10.66 | 9.738 | 17 29 10.4 | 39.66 | 3 45.20 | 0.118 | 3 9 55.86 |
| Sat. | 10 | 3 10 4.67 | 9.762 | 17 44 53.5 | 38.92 | 3 47.75 | 0.095 | 3 13 52.42 |
| *Sun.* | 11 | 3 13 59.22 | 9.785 | 18 0 18.6 | 38.17 | 3 49.76 | 0.072 | 3 17 48.98 |
| Mon. | 12 | 3 17 54.33 | 9.809 | 18 15 25.6 | 37.41 | 3 51.20 | 0.049 | 3 21 45.53 |
| Tues. | 13 | 3 21 50.02 | 9.832 | 18 30 14.4 | 36.64 | 3 52.07 | 0.025 | 3 25 42.09 |
| Wed. | 14 | 3 25 46.25 | 9.855 | 18 44 44.4 | 35.85 | 3 52.40 | 0.002 | 3 29 38.65 |
| Thur. | 15 | 3 29 43.04 | 9.878 | 18 58 55.2 | 35.05 | 3 52.16 | 0.021 | 3 33 35.20 |
| Fri. | 16 | 3 33 40.37 | 9.901 | 19 12 46.8 | 34.24 | 3 51.39 | 0.044 | 3 37 31.76 |
| Sat. | 17 | 3 37 38.27 | 9.924 | 19 26 18.8 | 33.42 | 3 50.05 | 0.067 | 3 41 28.32 |
| *Sun.* | 18 | 3 41 36.70 | 9.947 | 19 39 31.2 | 32.59 | 3 48.17 | 0.090 | 3 45 24.87 |
| Mon. | 19 | 3 45 35.70 | 9.969 | 19 52 23.6 | 31.76 | 3 45.73 | 0.113 | 3 49 21.43 |
| Tues. | 20 | 3 49 35.25 | 9.992 | 20 4 55.6 | 30.91 | 3 42.74 | 0.135 | 3 53 17.99 |
| Wed. | 21 | 3 53 35.32 | 10.015 | 20 17 7.2 | 30.05 | 3 39.23 | 0.157 | 3 57 14.55 |
| Thur. | 22 | 3 57 35.94 | 10.037 | 20 28 58.0 | 29.18 | 3 35.16 | 0.180 | 4 1 11.10 |
| Fri. | 23 | 4 1 37.10 | 10.059 | 20 40 27.9 | 28.31 | 3 30.56 | 0.202 | 4 5 7.66 |
| Sat. | 24 | 4 5 38.81 | 10.081 | 20 51 36.7 | 27.42 | 3 25.41 | 0.224 | 4 9 4.22 |
| *Sun.* | 25 | 4 9 41.05 | 10.103 | 21 2 24.2 | 26.53 | 3 19.72 | 0.246 | 4 13 0.77 |
| Mon. | 26 | 4 13 43.74 | 10.124 | 21 12 50.0 | 25.62 | 3 13.59 | 0.267 | 4 16 57.33 |
| Tues. | 27 | 4 17 46.97 | 10.145 | 21 22 53.9 | 24.70 | 3 6.92 | 0.288 | 4 20 53.89 |
| Wed. | 28 | 4 21 50.69 | 10.165 | 21 32 35.7 | 23.78 | 2 59.75 | 0.308 | 4 24 50.44 |
| Thur. | 29 | 4 25 54.88 | 10.186 | 21 41 55.3 | 22.85 | 2 52.12 | 0.328 | 4 28 47.00 |
| Fri. | 30 | 4 29 59.53 | 10.203 | 21 50 52.3 | 21.91 | 2 44.03 | 0.347 | 4 32 43.56 |
| Sat. | 31 | 4 34 4.63 | 10.221 | 21 59 26.6 | 20.96 | 2 35.49 | 0.365 | 4 36 40.12 |
| *Sun.* | 32 | 4 38 10.14 | 10.239 | N.22 7 38.1 | 19.99 | 2 26.54 | 0.383 | 4 40 36.68 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 122 | 41 16 4.7 | 15 55.9 | 145.42 | —0.52 | 0.0036310 | 45.4 | 21 18 6.63 |
| 2 | 123 | 42 14 14.2 | 14 5.3 | 145.35 | 0.39 | .0037390 | 44.7 | 21 14 10.72 |
| 3 | 124 | 43 12 22.1 | 12 13.1 | 145.29 | 0.24 | .0038454 | 44.0 | 21 10 14.80 |
| 4 | 125 | 44 10 28.4 | 10 19.2 | 145.23 | —0.11 | .0039501 | 43.3 | 21 6 18.90 |
| 5 | 126 | 45 8 33.1 | 8 23.8 | 145.17 | +0.01 | .0040531 | 42.6 | 21 2 22.98 |
| 6 | 127 | 46 6 36.0 | 6 26.5 | 145.10 | 0.13 | .0041543 | 41.9 | 20 58 27.07 |
| 7 | 128 | 47 4 37.1 | 4 27.5 | 145.02 | 0.20 | .0042537 | 41.1 | 20 54 31.17 |
| 8 | 129 | 48 2 36.5 | 2 26.7 | 144.94 | 0.27 | .0043512 | 40.4 | 20 50 35.25 |
| 9 | 130 | 49 0 34.1 | 0 24.1 | 144.87 | 0.30 | .0044468 | 39.6 | 20 46 39.35 |
| 10 | 131 | 49 58 30.0 | 58 19.9 | 144.79 | 0.31 | .0045408 | 38.9 | 20 42 43.44 |
| 11 | 132 | 50 56 24.1 | 56 13.8 | 144.72 | 0.30 | .0046334 | 38.4 | 20 38 47.51 |
| 12 | 133 | 51 54 16.4 | 54 6.0 | 144.65 | 0.24 | .0047246 | 37.9 | 20 34 51.61 |
| 13 | 134 | 52 52 6.9 | 51 56.3 | 144.57 | 0.16 | .0048143 | 37.4 | 20 30 55.70 |
| 14 | 135 | 53 49 55.6 | 49 44.8 | 144.49 | +0.06 | .0049028 | 36.9 | 20 26 59.78 |
| 15 | 136 | 54 47 42.6 | 47 31.6 | 144.42 | —0.07 | .0049902 | 36.4 | 20 23 3.88 |
| 16 | 137 | 55 45 28.0 | 45 16.9 | 144.36 | 0.20 | .0050765 | 35.9 | 20 19 7.97 |
| 17 | 138 | 56 43 11.8 | 43 0.5 | 144.30 | 0.33 | .0051617 | 35.5 | 20 15 12.05 |
| 18 | 139 | 57 40 54.1 | 40 42.6 | 144.24 | 0.46 | .0052459 | 35.0 | 20 11 16.15 |
| 19 | 140 | 58 38 35.0 | 38 23.3 | 144.18 | 0.57 | .0053292 | 34.5 | 20 7 20.24 |
| 20 | 141 | 59 36 14.5 | 36 2.7 | 144.13 | 0.68 | .0054114 | 34.0 | 20 3 24.32 |
| 21 | 142 | 60 33 52.8 | 33 40.8 | 144.08 | 0.76 | .0054927 | 33.5 | 19 59 28.41 |
| 22 | 143 | 61 31 30.0 | 31 17.8 | 144.04 | 0.81 | .0055730 | 33.0 | 19 55 32.49 |
| 23 | 144 | 62 29 6.1 | 28 53.7 | 144.00 | 0.83 | .0056522 | 32.5 | 19 51 36.59 |
| 24 | 145 | 63 26 41.3 | 26 28.7 | 143.96 | 0.82 | .0057301 | 32.0 | 19 47 40.68 |
| 25 | 146 | 64 24 15.6 | 24 2.8 | 143.92 | 0.77 | .0058066 | 31.5 | 19 43 44.77 |
| 26 | 147 | 65 21 48.9 | 21 36.0 | 143.88 | 0.70 | .0058817 | 30.9 | 19 39 48.85 |
| 27 | 148 | 66 19 21.4 | 19 8.3 | 143.84 | 0.61 | .0059550 | 30.2 | 19 35 52.94 |
| 28 | 149 | 67 16 53.0 | 16 39.7 | 143.80 | 0.51 | .0060266 | 29.5 | 19 31 57.04 |
| 29 | 150 | 68 14 23.8 | 14 10.4 | 143.76 | 0.38 | .0060962 | 28.5 | 19 28 1.13 |
| 30 | 151 | 69 11 53.8 | 11 40.2 | 143.73 | 0.24 | .0061637 | 27.7 | 19 24 5.21 |
| 31 | 152 | 70 9 23.0 | 9 9.2 | 143.69 | —0.10 | .0062290 | 26.9 | 19 20 9.30 |
| 32 | 153 | 71 6 51.4 | 6 37.4 | 143.65 | +0.02 | 0.0062921 | 26.0 | 19 16 13.38 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h m. | m. | d. |
| 1 | 16 30.0 | 16 32.1 | 60 27.0 | +0.76 | 60 34.6 | +0.48 | 22 3.4 | 2.02 | 26.3 |
| 2 | 16 33.2 | 16 33.3 | 60 38.6 | +0.18 | 60 38.9 | −0.14 | 22 54.5 | 2.09 | 27.3 |
| 3 | 16 32.3 | 16 30.2 | 60 35.2 | −0.48 | 60 27.5 | 0.80 | 23 47.9 | 2.20 | 28.3 |
| 4 | 16 27.0 | 16 22.9 | 60 16.0 | 1.11 | 60 0.9 | 1.39 | ϭ | | 29.3 |
| 5 | 16 17.9 | 16 12.2 | 59 42.6 | 1.64 | 59 21.6 | 1.85 | 0 44.3 | 2.31 | 0.9 |
| 6 | 16 5.9 | 15 59.1 | 58 58.3 | 2.01 | 58 33.3 | 2.13 | 1 43.2 | 2.39 | 1.9 |
| 7 | 15 52.0 | 15 44.8 | 58 7.3 | 2.19 | 57 40.8 | 2.20 | 2 43.3 | 2.39 | 2.9 |
| 8 | 15 37.6 | 15 30.6 | 57 14.4 | 2.17 | 56 48.7 | 2.10 | 3 42.3 | 2.31 | 3.9 |
| 9 | 15 23.9 | 15 17.5 | 56 23.9 | 2.01 | 56 0.5 | 1.88 | 4 38.3 | 2.16 | 4.9 |
| 10 | 15 11.6 | 15 6.2 | 55 38.8 | 1.72 | 55 19.2 | 1.54 | 5 29.9 | 1.98 | 5.9 |
| 11 | 15 1.5 | 14 57.4 | 55 1.8 | 1.35 | 54 46.7 | 1.15 | 6 17.3 | 1.82 | 6.9 |
| 12 | 14 53.9 | 14 51.2 | 54 34.1 | 0.94 | 54 24.0 | 0.72 | 7 0.9 | 1.69 | 7.9 |
| 13 | 14 49.2 | 14 47.8 | 54 16.5 | 0.52 | 54 11.4 | −0.32 | 7 41.8 | 1.60 | 8.9 |
| 14 | 14 47.0 | 14 46.9 | 54 8.7 | −0.12 | 54 8.4 | +0.07 | 8 21.1 | 1.56 | 9.9 |
| 15 | 14 47.5 | 14 48.6 | 54 10.4 | +0.25 | 54 14.5 | 0.41 | 8 59.9 | 1.57 | 10.9 |
| 16 | 14 50.2 | 14 52.3 | 54 20.4 | 0.56 | 54 28.0 | 0.70 | 9 39.5 | 1.62 | 11.9 |
| 17 | 14 54.8 | 14 57.7 | 54 37.2 | 0.82 | 54 47.8 | 0.93 | 10 21.0 | 1.71 | 12.9 |
| 18 | 15 0.9 | 15 4.4 | 54 59.6 | 1.03 | 55 12.5 | 1.11 | 11 5.3 | 1.84 | 13.9 |
| 19 | 15 8.1 | 15 12.0 | 55 26.2 | 1.17 | 55 40.5 | 1.21 | 11 53.3 | 2.00 | 14.9 |
| 20 | 15 16.1 | 15 20.2 | 55 55.3 | 1.25 | 56 10.5 | 1.28 | 12 45.5 | 2.16 | 15.9 |
| 21 | 15 24.4 | 15 28.6 | 56 25.9 | 1.29 | 56 41.4 | 1.29 | 13 41.3 | 2.28 | 16.9 |
| 22 | 15 32.8 | 15 37.0 | 56 56.8 | 1.28 | 57 12.1 | 1.27 | 14 39.3 | 2.33 | 17.9 |
| 23 | 15 41.1 | 15 45.1 | 57 27.2 | 1.25 | 57 42.0 | 1.22 | 15 37.5 | 2.30 | 18.9 |
| 24 | 15 49.1 | 15 53.0 | 57 56.5 | 1.20 | 58 10.7 | 1.17 | 16 34.1 | 2.21 | 19.9 |
| 25 | 15 56.7 | 16 0.3 | 58 24.5 | 1.13 | 58 37.7 | 1.08 | 17 27.8 | 2.10 | 20.9 |
| 26 | 16 3.7 | 16 7.0 | 58 50.3 | 1.03 | 59 2.3 | 0.97 | 18 18.8 | 2.00 | 21.9 |
| 27 | 16 10.0 | 16 12.8 | 59 13.5 | 0.89 | 59 23.6 | 0.79 | 19 7.8 | 1.94 | 22.9 |
| 28 | 16 15.2 | 16 17.2 | 59 32.5 | 0.67 | 59 39.8 | 0.53 | 19 56.0 | 1.94 | 23.9 |
| 29 | 16 18.7 | 16 19.7 | 59 45.4 | 0.38 | 59 49.0 | +0.20 | 20 44.9 | 1.99 | 24.9 |
| 30 | 16 20.0 | 16 19.7 | 59 50.3 | +0.00 | 59 49.0 | −0.22 | 21 35.7 | 2.09 | 25.9 |
| 31 | 16 18.6 | 16 16.8 | 59 45.0 | −0.45 | 59 38.3 | 0.68 | 22 29.5 | 2.22 | 26.9 |
| 32 | 16 14.2 | 16 10.9 | 59 28.8 | −0.90 | 59 16.7 | −1.11 | 23 26.6 | 2.34 | 27.9 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| THURSDAY 1. | | | | | SATURDAY 3. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 57 23.77 | 2.1700 | S. 2 49 5.2 | 17.442 | 0 | 1 43 4.92 | 2.2639 | N.11 1 36.7 | 16.445 |
| 1 | 23 59 33.97 | 2.1701 | 2 31 38.0 | 17.464 | 1 | 1 45 20.87 | 2.2676 | 11 18 1.4 | 16.377 |
| 2 | 0 1 44.18 | 2.1702 | 2 14 9.5 | 17.485 | 2 | 1 47 37.04 | 2.2713 | 11 34 22.0 | 16.307 |
| 3 | 0 3 54.40 | 2.1704 | 1 56 39.8 | 17.504 | 3 | 1 49 53.43 | 2.2752 | 11 50 38.3 | 16.236 |
| 4 | 0 6 4.63 | 2.1708 | 1 39 9.0 | 17.522 | 4 | 1 52 10.06 | 2.2791 | 12 6 50.3 | 16.162 |
| 5 | 0 8 14.89 | 2.1712 | 1 21 37.2 | 17.537 | 5 | 1 54 26.93 | 2.2830 | 12 22 57.8 | 16.087 |
| 6 | 0 10 25.17 | 2.1716 | 1 4 4.6 | 17.550 | 6 | 1 56 44.03 | 2.2870 | 12 39 0.7 | 16.009 |
| 7 | 0 12 35.48 | 2.1722 | 0 46 31.2 | 17.562 | 7 | 1 59 1.37 | 2.2911 | 12 54 58.9 | 15.930 |
| 8 | 0 14 45.83 | 2.1728 | 0 28 57.1 | 17.573 | 8 | 2 1 18.96 | 2.2953 | 13 10 52.3 | 15.848 |
| 9 | 0 16 56.21 | 2.1734 | S. 0 11 22.4 | 17.582 | 9 | 2 3 36.81 | 2.2995 | 13 26 40.7 | 15.765 |
| 10 | 0 19 6.64 | 2.1742 | N. 0 6 12.8 | 17.589 | 10 | 2 5 54.90 | 2.3037 | 13 42 24.1 | 15.680 |
| 11 | 0 21 17.12 | 2.1751 | 0 23 48.3 | 17.593 | 11 | 2 8 13.25 | 2.3080 | 13 58 2.3 | 15.592 |
| 12 | 0 23 27.65 | 2.1760 | 0 41 24.0 | 17.596 | 12 | 2 10 31.86 | 2.3123 | 14 13 35.2 | 15.503 |
| 13 | 0 25 38.24 | 2.1771 | 0 58 59.8 | 17.598 | 13 | 2 12 50.73 | 2.3166 | 14 29 2.7 | 15.412 |
| 14 | 0 27 48.90 | 2.1782 | 1 16 35.7 | 17.598 | 14 | 2 15 9.85 | 2.3209 | 14 44 24.7 | 15.320 |
| 15 | 0 29 59.63 | 2.1795 | 1 34 11.5 | 17.595 | 15 | 2 17 29.24 | 2.3253 | 14 59 41.1 | 15.225 |
| 16 | 0 32 10.44 | 2.1808 | 1 51 47.1 | 17.591 | 16 | 2 19 48.89 | 2.3298 | 15 14 51.7 | 15.128 |
| 17 | 0 34 21.33 | 2.1822 | 2 9 22.4 | 17.585 | 17 | 2 22 8.81 | 2.3343 | 15 29 56.5 | 15.030 |
| 18 | 0 36 32.30 | 2.1836 | 2 26 57.3 | 17.577 | 18 | 2 24 29.00 | 2.3388 | 15 44 55.3 | 14.929 |
| 19 | 0 38 43.36 | 2.1851 | 2 44 31.6 | 17.566 | 19 | 2 26 49.47 | 2.3434 | 15 59 48.0 | 14.827 |
| 20 | 0 40 54.52 | 2.1867 | 3 2 5.2 | 17.553 | 20 | 2 29 10 21 | 2.3479 | 16 14 34.5 | 14.724 |
| 21 | 0 43 5.78 | 2.1885 | 3 19 38.0 | 17.540 | 21 | 2 31 31.22 | 2.3525 | 16 29 14.7 | 14.617 |
| 22 | 0 45 17.14 | 2.1903 | 3 37 10.0 | 17.526 | 22 | 2 33 52.51 | 2.3571 | 16 43 48.5 | 14.509 |
| 23 | 0 47 28.62 | 2.1922 | N. 3 54 41.0 | 17.508 | 23 | 2 36 14.08 | 2.3617 | N.16 58 15.8 | 14.399 |
| FRIDAY 2. | | | | | SUNDAY 4. | | | | |
| 0 | 0 49 40.21 | 2.1942 | N. 4 12 10.9 | 17.488 | 0 | 2 38 35.92 | 2.3663 | N.17 12 36.4 | 14.287 |
| 1 | 0 51 51.92 | 2.1962 | 4 29 39.5 | 17.466 | 1 | 2 40 58.04 | 2.3710 | 17 26 50.3 | 14.174 |
| 2 | 0 54 3.76 | 2.1983 | 4 47 6.8 | 17.443 | 2 | 2 43 20.44 | 2.3758 | 17 40 57.3 | 14.059 |
| 3 | 0 56 15.72 | 2.2005 | 5 4 32.7 | 17.418 | 3 | 2 45 43.13 | 2.3806 | 17 54 57.4 | 13.942 |
| 4 | 0 58 27.81 | 2.2028 | 5 21 57.0 | 17.391 | 4 | 2 48 6.10 | 2.3851 | 18 8 50.4 | 13.823 |
| 5 | 1 0 40.05 | 2.2052 | 5 39 19.6 | 17.362 | 5 | 2 50 29.34 | 2.3897 | 18 22 36.2 | 13.702 |
| 6 | 1 2 52.43 | 2.2076 | 5 56 40.5 | 17.331 | 6 | 2 52 52.86 | 2.3944 | 18 36 14.7 | 13.580 |
| 7 | 1 5 4.96 | 2.2101 | 6 13 59.4 | 17.298 | 7 | 2 55 16.66 | 2.3991 | 18 49 45.8 | 13.456 |
| 8 | 1 7 17.64 | 2.2127 | 6 31 16.3 | 17.264 | 8 | 2 57 40.75 | 2.4038 | 19 3 9.4 | 13.331 |
| 9 | 1 9 30.48 | 2.2153 | 6 48 31.1 | 17.227 | 9 | 3 0 5.12 | 2.4085 | 19 16 25.5 | 13.204 |
| 10 | 1 11 43.48 | 2.2181 | 7 5 43.6 | 17.188 | 10 | 3 2 29.77 | 2.4132 | 19 29 33.9 | 13.075 |
| 11 | 1 13 56.65 | 2.2209 | 7 22 53.7 | 17.148 | 11 | 3 4 54.70 | 2.4178 | 19 42 34.5 | 12.943 |
| 12 | 1 16 9.99 | 2.2238 | 7 40 1.4 | 17.107 | 12 | 3 7 19.91 | 2.4225 | 19 55 27.1 | 12.810 |
| 13 | 1 18 23.50 | 2.2267 | 7 57 6.5 | 17.062 | 13 | 3 9 45.40 | 2.4271 | 20 8 11.7 | 12.677 |
| 14 | 1 20 37.19 | 2.2297 | 8 14 8.8 | 17.015 | 14 | 3 12 11.16 | 2.4317 | 20 20 48.3 | 12.542 |
| 15 | 1 22 51.07 | 2.2328 | 8 31 8.3 | 16.967 | 15 | 3 14 37.20 | 2.4362 | 20 33 16.7 | 12.403 |
| 16 | 1 25 5.13 | 2.2360 | 8 48 4.8 | 16.916 | 16 | 3 17 3.51 | 2.4408 | 20 45 36.7 | 12.264 |
| 17 | 1 27 19.39 | 2.2393 | 9 4 58.2 | 16.864 | 17 | 3 19 30.09 | 2.4453 | 20 57 48.4 | 12.124 |
| 18 | 1 29 33.85 | 2.2426 | 9 21 48.5 | 16.811 | 18 | 3 21 56.94 | 2.4498 | 21 9 51.6 | 11.982 |
| 19 | 1 31 48.51 | 2.2459 | 9 38 35.5 | 16.754 | 19 | 3 24 24.06 | 2.4543 | 21 21 46.2 | 11.838 |
| 20 | 1 34 3.36 | 2.2493 | 9 55 19.0 | 16.696 | 20 | 3 26 51.45 | 2.4587 | 21 33 32.2 | 11.693 |
| 21 | 1 36 18.42 | 2.2528 | 10 11 59.0 | 16.637 | 21 | 3 29 19.10 | 2.4630 | 21 45 9.4 | 11.547 |
| 22 | 1 38 33.70 | 2.2565 | 10 28 35.4 | 16.575 | 22 | 3 31 47.01 | 2.4673 | 21 56 37.8 | 11.398 |
| 23 | 1 40 49.20 | 2.2602 | 10 45 8.0 | 16.511 | 23 | 3 34 15.18 | 2.4716 | 22 7 57.2 | 11.248 |
| 24 | 1 43 4.92 | 2.2639 | N.11 1 36.7 | 16.445 | 24 | 3 36 43.61 | 2.4759 | N.22 19 7.6 | 11.097 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### MONDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 36 43.61 | 2.4759 | N.22 19 7.6 | 11.097 |
| 1 | 3 39 12.29 | 2.4801 | 22 30 8.9 | 10.945 |
| 2 | 3 41 41.22 | 2.4842 | 22 41 1.0 | 10.792 |
| 3 | 3 44 10.39 | 2.4883 | 22 51 43.9 | 10.637 |
| 4 | 3 46 39.81 | 2.4923 | 23 2 17.5 | 10.481 |
| 5 | 3 49 9.46 | 2.4962 | 23 12 41.6 | 10.323 |
| 6 | 3 51 39.35 | 2.5001 | 23 22 56.2 | 10.164 |
| 7 | 3 54 9.47 | 2.5039 | 23 33 1.3 | 10.004 |
| 8 | 3 56 39.81 | 2.5076 | 23 42 56.7 | 9.842 |
| 9 | 3 59 10.38 | 2.5113 | 23 52 42.3 | 9.679 |
| 10 | 4 1 41.16 | 2.5148 | 24 2 18.2 | 9.516 |
| 11 | 4 4 12.15 | 2.5183 | 24 11 44.2 | 9.351 |
| 12 | 4 6 43.36 | 2.5218 | 24 21 0.3 | 9.185 |
| 13 | 4 9 14.77 | 2.5251 | 24 30 6.4 | 9.018 |
| 14 | 4 11 46.37 | 2.5282 | 24 39 2 5 | 8.850 |
| 15 | 4 14 18.15 | 2.5313 | 24 47 48.4 | 8.680 |
| 16 | 4 16 50.12 | 2.5343 | 24 56 24.1 | 8.510 |
| 17 | 4 19 22.27 | 2.5373 | 25 4 49 6 | 8.340 |
| 18 | 4 21 54.59 | 2.5401 | 25 13 4.9 | 8.168 |
| 19 | 4 24 27.08 | 2.5426 | 25 21 9.8 | 7.995 |
| 20 | 4 26 59.72 | 2.5453 | 25 29 4.3 | 7.822 |
| 21 | 4 29 32.52 | 2.5479 | 25 36 48.4 | 7.648 |
| 22 | 4 32 5.47 | 2.5503 | 25 44 22.0 | 7.472 |
| 23 | 4 34 38.55 | 2.5526 | N.25 51 45.0 | 7.296 |

### TUESDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 4 37 11.77 | 2.5547 | N.25 58 57.5 | 7.119 |
| 1 | 4 39 45.12 | 2.5568 | 26 5 59.3 | 6.942 |
| 2 | 4 42 18.58 | 2.5586 | 26 12 50.5 | 6.765 |
| 3 | 4 44 52.15 | 2.5604 | 26 19 31.1 | 6.587 |
| 4 | 4 47 25.83 | 2.5621 | 26 26 1.0 | 6.408 |
| 5 | 4 49 59.60 | 2.5636 | 26 32 20.1 | 6.228 |
| 6 | 4 52 33.45 | 2.5649 | 26 38 28.3 | 6.048 |
| 7 | 4 55 7.38 | 2.5662 | 26 44 25.8 | 5.867 |
| 8 | 4 57 41.39 | 2.5674 | 26 50 12.4 | 5.686 |
| 9 | 5 0 15.47 | 2.5684 | 26 55 48.1 | 5.505 |
| 10 | 5 2 49.60 | 2.5693 | 27 1 13.0 | 5.323 |
| 11 | 5 5 23.78 | 2.5700 | 27 6 26.9 | 5.141 |
| 12 | 5 7 58.00 | 2.5706 | 27 11 29.9 | 4.958 |
| 13 | 5 10 32.25 | 2.5710 | 27 16 21.9 | 4.776 |
| 14 | 5 13 6.52 | 2.5713 | 27 21 3.0 | 4.594 |
| 15 | 5 15 40.81 | 2.5715 | 27 25 33.2 | 4.412 |
| 16 | 5 18 15.10 | 2.5715 | 27 29 52.4 | 4.229 |
| 17 | 5 20 49.39 | 2.5713 | 27 34 0.6 | 4.046 |
| 18 | 5 23 23.66 | 2.5710 | 27 37 57.9 | 3.863 |
| 19 | 5 25 57.91 | 2.5706 | 27 41 44.2 | 3.680 |
| 20 | 5 28 32.13 | 2.5701 | 27 45 19.5 | 3.497 |
| 21 | 5 31 6.32 | 2.5694 | 27 48 43.8 | 3.314 |
| 22 | 5 33 40.46 | 2.5685 | 27 51 57.2 | 3.132 |
| 23 | 5 36 14.54 | 2.5675 | 27 54 59.6 | 2.949 |
| 24 | 5 38 48.56 | 2.5664 | N.27 57 51.0 | 2.766 |

### WEDNESDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 5 38 48.56 | 2.5664 | N.27 57 51.0 | 2.766 |
| 1 | 5 41 22.51 | 2.5651 | 28 0 31.5 | 2.584 |
| 2 | 5 43 56.37 | 2.5636 | 28 3 1.1 | 2.402 |
| 3 | 5 46 30.14 | 2.5620 | 28 5 19.7 | 2.220 |
| 4 | 5 49 3.81 | 2.5602 | 28 7 27.4 | 2.039 |
| 5 | 5 51 37.37 | 2.5583 | 28 9 24.3 | 1.858 |
| 6 | 5 54 10.81 | 2.5563 | 28 11 10.4 | 1.677 |
| 7 | 5 56 44.13 | 2.5542 | 28 12 45.6 | 1.497 |
| 8 | 5 59 17.31 | 2.5518 | 28 14 10.0 | 1.317 |
| 9 | 6 1 50.35 | 2.5494 | 28 15 23.6 | 1.138 |
| 10 | 6 4 23.24 | 2.5468 | 28 16 26.5 | 0.959 |
| 11 | 6 6 55 96 | 2.5439 | 28 17 18.7 | 0.780 |
| 12 | 6 9 28.51 | 2.5410 | 28 18 0.1 | 0.602 |
| 13 | 6 12 0.88 | 2.5380 | 28 18 30.9 | 0.425 |
| 14 | 6 14 33.07 | 2.5349 | 28 18 51.1 | 0.249 |
| 15 | 6 17 5.07 | 2.5317 | 28 19 0.8 | 0.074 |
| 16 | 6 19 36 87 | 2.5282 | 28 19 0.0 | 0.101 |
| 17 | 6 22 8.45 | 2.5245 | 28 18 48.7 | 0.276 |
| 18 | 6 24 39.81 | 2.5208 | 28 18 26.9 | 0.450 |
| 19 | 6 27 10.95 | 2.5170 | 28 17 54.7 | 0.622 |
| 20 | 6 29 41.85 | 2.5130 | 28 17 12.2 | 0.793 |
| 21 | 6 32 12.51 | 2.5090 | 28 16 19.5 | 0.964 |
| 22 | 6 34 42.93 | 2.5048 | 28 15 16.5 | 1.134 |
| 23 | 6 37 13 09 | 2.5004 | N.28 14 3.4 | 1.303 |

### THURSDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 6 39 42.98 | 2.4959 | N.28 12 40.1 | 1.472 |
| 1 | 6 42 12.60 | 2.4914 | 28 11 6.7 | 1.640 |
| 2 | 6 44 41.95 | 2.4868 | 28 9 23.3 | 1.806 |
| 3 | 6 47 11.02 | 2.4821 | 28 7 30.0 | 1.972 |
| 4 | 6 49 39.80 | 2.4771 | 28 5 26.7 | 2.137 |
| 5 | 6 52 8.27 | 2.4720 | 28 3 13.6 | 2.299 |
| 6 | 6 54 36.44 | 2.4669 | 28 0 50.8 | 2.461 |
| 7 | 6 57 4.30 | 2.4617 | 27 58 18.3 | 2.623 |
| 8 | 6 59 31.84 | 2.4564 | 27 55 36.1 | 2.784 |
| 9 | 7 1 59.07 | 2.4511 | 27 52 44.2 | 2.945 |
| 10 | 7 4 25.97 | 2.4455 | 27 49 42.7 | 3.103 |
| 11 | 7 6 52.53 | 2.4399 | 27 46 31.8 | 3.260 |
| 12 | 7 9 18.76 | 2.4342 | 27 43 11.5 | 3.416 |
| 13 | 7 11 44.64 | 2.4284 | 27 39 41.9 | 3.570 |
| 14 | 7 14 10.17 | 2.4226 | 27 36 3.1 | 3.724 |
| 15 | 7 16 35.35 | 2.4167 | 27 32 15.0 | 3.877 |
| 16 | 7 19 0.17 | 2.4107 | 27 28 17.8 | 4.028 |
| 17 | 7 21 24.63 | 2.4046 | 27 24 11.6 | 4.177 |
| 18 | 7 23 48.72 | 2.3984 | 27 19 56.5 | 4.326 |
| 19 | 7 26 12.44 | 2.3922 | 27 15 32.5 | 4.474 |
| 20 | 7 28 35.78 | 2.3859 | 27 10 59.6 | 4.621 |
| 21 | 7 30 58.74 | 2.3795 | 27 6 18.0 | 4.766 |
| 22 | 7 33 21.32 | 2.3731 | 27 1 27.7 | 4.909 |
| 23 | 7 35 43.51 | 2.3666 | 26 56 28.9 | 5.052 |
| 24 | 7 38 5.31 | 2.3601 | N.26 51 21.5 | 5.193 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ″ | ″ |
| 0 | 7 38 5.31 | 2.3601 | N.26 51 21.5 | 5.193 |
| 1 | 7 40 26.72 | 2.3535 | 26 46 5.7 | 5.332 |
| 2 | 7 42 47.73 | 2.3468 | 26 40 41.6 | 5.471 |
| 3 | 7 45 8.34 | 2.3402 | 26 35 9.2 | 5.608 |
| 4 | 7 47 28.55 | 2.3335 | 26 29 28.6 | 5.744 |
| 5 | 7 49 48.36 | 2.3267 | 26 23 39.9 | 5.879 |
| 6 | 7 52 7.76 | 2.3199 | 26 17 43.1 | 6.012 |
| 7 | 7 54 26.75 | 2.3131 | 26 11 38.4 | 6.144 |
| 8 | 7 56 45.33 | 2.3062 | 26 5 25.8 | 6.275 |
| 9 | 7 59 3.50 | 2.2993 | 25 59 5.4 | 6.405 |
| 10 | 8 1 21.25 | 2.2924 | 25 52 37.3 | 6.533 |
| 11 | 8 3 38.59 | 2.2855 | 25 46 1.5 | 6.659 |
| 12 | 8 5 55.51 | 2.2786 | 25 39 18.2 | 6.784 |
| 13 | 8 8 12.01 | 2.2716 | 25 32 27.4 | 6.908 |
| 14 | 8 10 28.09 | 2.2646 | 25 25 29.2 | 7.032 |
| 15 | 8 12 43.75 | 2.2575 | 25 18 23.6 | 7.154 |
| 16 | 8 14 58.99 | 2.2505 | 25 11 10.8 | 7.275 |
| 17 | 8 17 13.81 | 2.2435 | 25 3 50.8 | 7.393 |
| 18 | 8 19 28.21 | 2.2364 | 24 56 23.7 | 7.510 |
| 19 | 8 21 42.18 | 2.2293 | 24 48 49.6 | 7.626 |
| 20 | 8 23 55.73 | 2.2223 | 24 41 8.6 | 7.740 |
| 21 | 8 26 8.86 | 2.2153 | 24 33 20.8 | 7.853 |
| 22 | 8 28 21.57 | 2.2083 | 24 25 26.2 | 7.966 |
| 23 | 8 30 33.85 | 2.2012 | N.24 17 24.9 | 8.077 |

### SATURDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 8 32 45.71 | 2.1942 | N.24 9 16.9 | 8.187 |
| 1 | 8 34 57.15 | 2.1872 | 24 1 2.4 | 8.296 |
| 2 | 8 37 8.17 | 2.1802 | 23 52 41.4 | 8.403 |
| 3 | 8 39 18.77 | 2.1732 | 23 44 14.0 | 8.509 |
| 4 | 8 41 28.95 | 2.1662 | 23 35 40.3 | 8.613 |
| 5 | 8 43 38.72 | 2.1593 | 23 27 0.4 | 8.717 |
| 6 | 8 45 48.07 | 2.1523 | 23 18 14.3 | 8.819 |
| 7 | 8 47 57,00 | 2.1454 | 23 9 22.1 | 8.919 |
| 8 | 8 50 5.52 | 2.1386 | 23 0 24.0 | 9.018 |
| 9 | 8 52 13.63 | 2.1317 | 22 51 19.9 | 9.117 |
| 10 | 8 54 21.32 | 2.1248 | 22 42 10.0 | 9.213 |
| 11 | 8 56 28.60 | 2.1180 | 22 32 54.3 | 9.309 |
| 12 | 8 58 35.48 | 2.1113 | 22 23 32.9 | 9.404 |
| 13 | 9 0 41.95 | 2.1045 | 22 14 5.8 | 9.497 |
| 14 | 9 2 48.02 | 2.0978 | 22 4 33.2 | 9.588 |
| 15 | 9 4 53.69 | 2.0911 | 21 54 55.2 | 9.679 |
| 16 | 9 6 58.95 | 2.0844 | 21 45 11.7 | 9.769 |
| 17 | 9 9 3.82 | 2.0779 | 21 35 22.9 | 9.857 |
| 18 | 9 11 8.30 | 2.0714 | 21 25 28.8 | 9.946 |
| 19 | 9 13 12.39 | 2.0649 | 21 15 29.5 | 10.031 |
| 20 | 9 15 16.09 | 2.0583 | 21 5 25.1 | 10.117 |
| 21 | 9 17 19.39 | 2.0518 | 20 55 15.5 | 10.201 |
| 22 | 9 19 22,31 | 2.0455 | 20 45 1.0 | 10.283 |
| 23 | 9 21 24.85 | 2.0393 | 20 34 41.6 | 10.364 |
| 24 | 9 23 27.02 | 2.0330 | N.20 24 17.3 | 10.445 |

### SUNDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 23 27.02 | 2.0330 | N.20 24 17.3 | 10.445 |
| 1 | 9 25 28.81 | 2.0268 | 20 13 48.2 | 10.524 |
| 2 | 9 27 30.23 | 2.0207 | 20 3 14.4 | 10.603 |
| 3 | 9 29 31.29 | 2.0146 | 19 52 35.9 | 10.680 |
| 4 | 9 31 31.98 | 2.0085 | 19 41 52.8 | 10.756 |
| 5 | 9 33 32.31 | 2.0024 | 19 31 5.2 | 10.831 |
| 6 | 9 35 32.27 | 1.9963 | 19 20 13.1 | 10.906 |
| 7 | 9 37 31.87 | 1.9904 | 19 9 16.6 | 10.978 |
| 8 | 9 39 31.12 | 1.9845 | 18 58 15.7 | 11.050 |
| 9 | 9 41 30.01 | 1.9786 | 18 47 10.6 | 11.120 |
| 10 | 9 43 28.55 | 1.9728 | 18 36 1.3 | 11.189 |
| 11 | 9 45 26.75 | 1.9672 | 18 24 47.9 | 11.256 |
| 12 | 9 47 24.62 | 1.9617 | 18 13 30.3 | 11.326 |
| 13 | 9 49 22.15 | 1.9561 | 18 2 8.7 | 11.392 |
| 14 | 9 51 19.35 | 1.9506 | 17 50 43.2 | 11.457 |
| 15 | 9 53 16.22 | 1.9452 | 17 39 13.8 | 11.522 |
| 16 | 9 55 12.77 | 1.9398 | 17 27 40.5 | 11.586 |
| 17 | 9 57 9.00 | 1.9345 | 17 16 3.5 | 11.649 |
| 18 | 9 59 4.91 | 1.9293 | 17 4 22.7 | 11.711 |
| 19 | 10 1 0.51 | 1.9241 | 16 52 38.2 | 11.771 |
| 20 | 10 2 55.80 | 1.9189 | 16 40 50.2 | 11.830 |
| 21 | 10 4 50.78 | 1.9138 | 16 28 58.6 | 11.889 |
| 22 | 10 6 45.46 | 1.9089 | 16 17 3.5 | 11.947 |
| 23 | 10 8 39.85 | 1.9040 | N.16 5 5.0 | 12.004 |

### MONDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 10 10 33.94 | 1.8991 | N.15 53 3.0 | 12.061 |
| 1 | 10 12 27.74 | 1.8943 | 15 40 57.7 | 12.116 |
| 2 | 10 14 21.26 | 1.8897 | 15 28 49.1 | 12.170 |
| 3 | 10 16 14.50 | 1.8850 | 15 16 37.3 | 12.223 |
| 4 | 10 18 7.46 | 1.8804 | 15 4 22.3 | 12.276 |
| 5 | 10 20 0.15 | 1.8760 | 14 52 4.2 | 12.327 |
| 6 | 10 21 52.58 | 1.8716 | 14 39 43.0 | 12.378 |
| 7 | 10 23 44.74 | 1.8672 | 14 27 18.8 | 12.428 |
| 8 | 10 25 36.64 | 1.8628 | 14 14 51.6 | 12.477 |
| 9 | 10 27 28.28 | 1.8586 | 14 2 21.5 | 12.526 |
| 10 | 10 29 19.67 | 1.8544 | 13 49 48.5 | 12.573 |
| 11 | 10 31 10.81 | 1.8503 | 13 37 12.7 | 12.619 |
| 12 | 10 33 1.71 | 1.8463 | 13 24 34.2 | 12.665 |
| 13 | 10 34 52.37 | 1.8424 | 13 11 52.9 | 12.710 |
| 14 | 10 36 42.80 | 1.8386 | 12 59 9.0 | 12.754 |
| 15 | 10 38 33.00 | 1.8348 | 12 46 22.5 | 12.797 |
| 16 | 10 40 22.97 | 1.8310 | 12 33 33.4 | 12.839 |
| 17 | 10 42 12.72 | 1.8273 | 12 20 41.8 | 12.881 |
| 18 | 10 44 2.25 | 1.8238 | 12 7 47.7 | 12.922 |
| 19 | 10 45 51.57 | 1.8203 | 11 54 51.2 | 12.962 |
| 20 | 10 47 40.68 | 1.8168 | 11 41 52.3 | 13.001 |
| 21 | 10 49 29.59 | 1.8135 | 11 28 51.1 | 13.039 |
| 22 | 10 51 18.30 | 1.8102 | 11 15 47.6 | 13.077 |
| 23 | 10 53 6.82 | 1.8070 | 11 2 41.9 | 13.114 |
| 24 | 10 54 55.14 | 1.8039 | N.10 49 33.9 | 13.151 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 54 55.14 | 1.8039 | N.10 49 33.9 | 13.151 |
| 1 | 10 56 43.28 | 1.8008 | 10 36 23.8 | 13.186 |
| 2 | 10 58 31.24 | 1.7978 | 10 23 11.6 | 13.221 |
| 3 | 11 0 19.02 | 1.7949 | 10 9 57.3 | 13.255 |
| 4 | 11 2 6.63 | 1.7921 | 9 56 41.0 | 13.288 |
| 5 | 11 3 54.07 | 1.7893 | 9 43 22.7 | 13.321 |
| 6 | 11 5 41.35 | 1.7867 | 9 30 2.5 | 13.352 |
| 7 | 11 7 28.47 | 1.7841 | 9 16 40.4 | 13.383 |
| 8 | 11 9 15.44 | 1.7815 | 9 3 16.5 | 13.414 |
| 9 | 11 11 2.25 | 1.7789 | 8 49 50.7 | 13.445 |
| 10 | 11 12 48.91 | 1.7766 | 8 36 23.1 | 13.473 |
| 11 | 11 14 35.44 | 1.7743 | 8 22 53.9 | 13.501 |
| 12 | 11 16 21.83 | 1.7721 | 8 9 23.0 | 13.528 |
| 13 | 11 18 8.09 | 1.7699 | 7 55 50.5 | 13.555 |
| 14 | 11 19 54.22 | 1.7678 | 7 42 16.4 | 13.582 |
| 15 | 11 21 40.23 | 1.7658 | 7 28 40.7 | 13.607 |
| 16 | 11 23 26.12 | 1.7638 | 7 15 3.5 | 13.632 |
| 17 | 11 25 11.89 | 1.7619 | 7 1 24.9 | 13.656 |
| 18 | 11 26 57.55 | 1.7601 | 6 47 44.8 | 13.680 |
| 19 | 11 28 43.10 | 1.7584 | 6 34 3.3 | 13.702 |
| 20 | 11 30 28.56 | 1.7568 | 6 20 20.5 | 13.723 |
| 21 | 11 32 13.92 | 1.7553 | 6 6 36.5 | 13.744 |
| 22 | 11 33 59.19 | 1.7538 | 5 52 51.2 | 13.765 |
| 23 | 11 35 44.37 | 1.7523 | N. 5 39 4.7 | 13.786 |

### WEDNESDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 37 29.47 | 1.7510 | N. 5 25 16.9 | 13.806 |
| 1 | 11 39 14.49 | 1.7498 | 5 11 28.0 | 13.824 |
| 2 | 11 40 59.44 | 1.7485 | 4 57 38.0 | 13.841 |
| 3 | 11 42 44.31 | 1.7473 | 4 43 47.0 | 13.858 |
| 4 | 11 44 29.12 | 1.7463 | 4 29 55.0 | 13.875 |
| 5 | 11 46 13.87 | 1.7454 | 4 16 2.0 | 13.892 |
| 6 | 11 47 58.57 | 1.7446 | 4 2 8.0 | 13.907 |
| 7 | 11 49 43.22 | 1.7438 | 3 48 13.1 | 13.922 |
| 8 | 11 51 27.82 | 1.7430 | 3 34 17.4 | 13.935 |
| 9 | 11 53 12.37 | 1.7422 | 3 20 20.9 | 13.948 |
| 10 | 11 54 56.88 | 1.7416 | 3 6 23.6 | 13.961 |
| 11 | 11 56 41.36 | 1.7412 | 2 52 25.6 | 13.973 |
| 12 | 11 58 25.82 | 1.7407 | 2 38 26.8 | 13.985 |
| 13 | 12 0 10.25 | 1.7403 | 2 24 27.4 | 13.995 |
| 14 | 12 1 54.66 | 1.7400 | 2 10 27.4 | 14.005 |
| 15 | 12 3 39.05 | 1.7398 | 1 56 26.8 | 14.014 |
| 16 | 12 5 23.43 | 1.7397 | 1 42 25.7 | 14.023 |
| 17 | 12 7 7.81 | 1.7396 | 1 28 24.1 | 14.031 |
| 18 | 12 8 52.18 | 1.7395 | 1 14 22.0 | 14.038 |
| 19 | 12 10 36.55 | 1.7396 | 1 0 19.5 | 14.044 |
| 20 | 12 12 20.93 | 1.7398 | 0 46 16.7 | 14.050 |
| 21 | 12 14 5.33 | 1.7401 | 0 32 13.5 | 14.056 |
| 22 | 12 15 49.74 | 1.7404 | 0 18 10.0 | 14.060 |
| 23 | 12 17 34.17 | 1.7407 | N. 0 4 6.3 | 14.064 |
| 24 | 12 19 18.62 | 1.7411 | S. 0 9 57.6 | 14.067 |

### THURSDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s | s. | ° ′ ″ | ″ |
| 0 | 12 19 18.62 | 1.7411 | S. 0 9 57.6 | 14.067 |
| 1 | 12 21 3.10 | 1.7417 | 0 24 1.7 | 14.069 |
| 2 | 12 22 47.62 | 1.7423 | 0 38 5.9 | 14.071 |
| 3 | 12 24 32.17 | 1.7429 | 0 52 10.2 | 14.072 |
| 4 | 12 26 16.77 | 1.7436 | 1 6 14.5 | 14.072 |
| 5 | 12 28 1.41 | 1.7444 | 1 20 18.9 | 14.072 |
| 6 | 12 29 46.10 | 1.7453 | 1 34 23.2 | 14.071 |
| 7 | 12 31 30.85 | 1.7463 | 1 48 27.4 | 14.069 |
| 8 | 12 33 15.67 | 1.7474 | 2 2 31.5 | 14.067 |
| 9 | 12 35 0.54 | 1.7485 | 2 16 35.5 | 14.065 |
| 10 | 12 36 45.48 | 1.7497 | 2 30 39.3 | 14.061 |
| 11 | 12 38 30.50 | 1.7509 | 2 44 42.8 | 14.056 |
| 12 | 12 40 15.59 | 1.7522 | 2 58 46.0 | 14.051 |
| 13 | 12 42 0.76 | 1.7536 | 3 12 48.9 | 14.045 |
| 14 | 12 43 46.02 | 1.7552 | 3 26 51.4 | 14.038 |
| 15 | 12 45 31.38 | 1.7568 | 3 40 53.5 | 14.031 |
| 16 | 12 47 16.83 | 1.7584 | 3 54 55.1 | 14.022 |
| 17 | 12 49 2.38 | 1.7600 | 4 8 56.2 | 14.013 |
| 18 | 12 50 48.03 | 1.7617 | 4 22 56.7 | 14.003 |
| 19 | 12 52 33.78 | 1.7635 | 4 36 56.6 | 13.993 |
| 20 | 12 54 19.65 | 1.7656 | 4 50 55.9 | 13.982 |
| 21 | 12 56 5.65 | 1.7677 | 5 4 54.5 | 13.970 |
| 22 | 12 57 51.77 | 1.7697 | 5 18 52.3 | 13.957 |
| 23 | 12 59 38.01 | 1.7718 | S. 5 32 49.4 | 13.944 |

### FRIDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 13 1 24.38 | 1.7739 | S. 5 46 45.6 | 13.929 |
| 1 | 13 3 10.88 | 1.7763 | 6 0 40.9 | 13.914 |
| 2 | 13 4 57.53 | 1.7787 | 6 14 35.3 | 13.899 |
| 3 | 13 6 44.32 | 1.7811 | 6 28 28.8 | 13.882 |
| 4 | 13 8 31.26 | 1.7836 | 6 42 21.2 | 13.865 |
| 5 | 13 10 18.35 | 1.7861 | 6 56 12.5 | 13.847 |
| 6 | 13 12 5.59 | 1.7887 | 7 10 2.8 | 13.828 |
| 7 | 13 13 52.99 | 1.7914 | 7 23 51.9 | 13.808 |
| 8 | 13 15 30.56 | 1.7942 | 7 37 39.7 | 13.787 |
| 9 | 13 17 28.30 | 1.7971 | 7 51 26.3 | 13.766 |
| 10 | 13 19 16.21 | 1.8000 | 8 5 11.6 | 13.743 |
| 11 | 13 21 4.30 | 1.8030 | 8 18 55.5 | 13.719 |
| 12 | 13 22 52.57 | 1.8060 | 8 32 37.9 | 13.695 |
| 13 | 13 24 41.02 | 1.8092 | 8 46 18.9 | 13.671 |
| 14 | 13 26 29.67 | 1.8125 | 8 59 58.4 | 13.645 |
| 15 | 13 28 18.51 | 1.8158 | 9 13 36.3 | 13.618 |
| 16 | 13 30 7.55 | 1.8191 | 9 27 12.6 | 13.591 |
| 17 | 13 31 56.80 | 1.8225 | 9 40 47.2 | 13.562 |
| 18 | 13 33 46.25 | 1.8259 | 9 54 20.1 | 13.533 |
| 19 | 13 35 35.91 | 1.8295 | 10 7 51.2 | 13.503 |
| 20 | 13 37 25.79 | 1.8332 | 10 21 20.5 | 13.472 |
| 21 | 13 39 15.89 | 1.8369 | 10 34 47.9 | 13.441 |
| 22 | 13 41 6.22 | 1.8407 | 10 48 13.4 | 13.407 |
| 23 | 13 42 56.78 | 1.8445 | 11 1 36.8 | 13.373 |
| 24 | 13 44 47.56 | 1.8483 | S.11 14 58.2 | 13.339 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 17.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 13 44 47.56 | 1.8483 | S.11 14 58.2 | 13.339 |
| 1 | 13 46 38.58 | 1.8523 | 11 28 17.5 | 13.304 |
| 2 | 13 48 29.84 | 1.8564 | 11 41 34.7 | 13.267 |
| 3 | 13 50 21.35 | 1.8606 | 11 54 49.6 | 13.229 |
| 4 | 13 52 13.11 | 1.8647 | 12 8 2.2 | 13.191 |
| 5 | 13 54 5.12 | 1.8689 | 12 21 12.5 | 13.152 |
| 6 | 13 55 57.38 | 1.8732 | 12 34 20.4 | 13.112 |
| 7 | 13 57 49.90 | 1.8776 | 12 47 25.9 | 13.070 |
| 8 | 13 59 42.69 | 1.8821 | 13 0 28.8 | 13.027 |
| 9 | 14 1 35.75 | 1.8866 | 13 13 29.1 | 12.983 |
| 10 | 14 3 29.08 | 1.8911 | 13 26 26.8 | 12.938 |
| 11 | 14 5 22.68 | 1.8957 | 13 39 21.7 | 12.893 |
| 12 | 14 7 16.56 | 1.9003 | 13 52 13.9 | 12.847 |
| 13 | 14 9 10.72 | 1.9051 | 14 5 3.3 | 12.799 |
| 14 | 14 11 5.17 | 1.9100 | 14 17 49.8 | 12.749 |
| 15 | 14 12 59.92 | 1.9149 | 14 30 33.2 | 12.699 |
| 16 | 14 14 54.96 | 1.9198 | 14 43 13.7 | 12.649 |
| 17 | 14 16 50.29 | 1.9247 | 14 55 51.1 | 12.597 |
| 18 | 14 18 45.92 | 1.9297 | 15 8 25.4 | 12.545 |
| 19 | 14 20 41.85 | 1.9349 | 15 20 56.5 | 12.491 |
| 20 | 14 22 38.10 | 1.9401 | 15 33 24.3 | 12.435 |
| 21 | 14 24 34.66 | 1.9453 | 15 45 48.7 | 12.379 |
| 22 | 14 26 31.53 | 1.9505 | 15 58 9.8 | 12.322 |
| 23 | 14 28 28.72 | 1.9558 | S.16 10 27.4 | 12.263 |

### SUNDAY 18.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 14 30 26.24 | 1.9613 | S.16 22 41.4 | 12.203 |
| 1 | 14 32 24.08 | 1.9668 | 16 34 51.8 | 12.143 |
| 2 | 14 34 22.25 | 1.9722 | 16 46 58.6 | 12.082 |
| 3 | 14 36 20.74 | 1.9777 | 16 59 1.6 | 12.018 |
| 4 | 14 38 19.57 | 1.9833 | 17 11 0.8 | 11.954 |
| 5 | 14 40 18.74 | 1.9890 | 17 22 56.1 | 11.888 |
| 6 | 14 42 18.25 | 1.9947 | 17 34 47.4 | 11.822 |
| 7 | 14 44 18.10 | 2.0004 | 17 46 34.7 | 11.754 |
| 8 | 14 46 18.30 | 2.0062 | 17 58 17.9 | 11.686 |
| 9 | 14 48 18.85 | 2.0121 | 18 9 57.0 | 11.616 |
| 10 | 14 50 19.75 | 2.0180 | 18 21 31.8 | 11.544 |
| 11 | 14 52 21.01 | 2.0239 | 18 33 2.3 | 11.472 |
| 12 | 14 54 22.62 | 2.0298 | 18 44 28.4 | 11.398 |
| 13 | 14 56 24.59 | 2.0358 | 18 55 50.1 | 11.323 |
| 14 | 14 58 26.92 | 2.0419 | 19 7 7.2 | 11.247 |
| 15 | 15 0 29.62 | 2.0480 | 19 18 19.7 | 11.169 |
| 16 | 15 2 32.68 | 2.0541 | 19 29 27.5 | 11.091 |
| 17 | 15 4 36.11 | 2.0602 | 19 40 30.6 | 11.011 |
| 18 | 15 6 39.91 | 2.0664 | 19 51 28.8 | 10.929 |
| 19 | 15 8 44.08 | 2.0727 | 20 2 22.1 | 10.847 |
| 20 | 15 10 48.63 | 2.0789 | 20 13 10.5 | 10.764 |
| 21 | 15 12 53.55 | 2.0852 | 20 23 53.8 | 10.678 |
| 22 | 15 14 58.85 | 2.0915 | 20 34 31.9 | 10.592 |
| 23 | 15 17 4.53 | 2.0979 | 20 45 4.8 | 10.506 |
| 24 | 15 19 10.60 | 2.1043 | S.20 55 32.5 | 10.417 |

### MONDAY 19.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 15 19 10.60 | 2.1043 | S.20 55 32.5 | 10.417 |
| 1 | 15 21 17.05 | 2.1107 | 21 5 54.8 | 10.326 |
| 2 | 15 23 23.88 | 2.1171 | 21 16 11.6 | 10.234 |
| 3 | 15 25 31.10 | 2.1235 | 21 26 22.9 | 10.142 |
| 4 | 15 27 38.70 | 2.1299 | 21 36 28.6 | 10.047 |
| 5 | 15 29 46.69 | 2.1364 | 21 46 28.6 | 9.952 |
| 6 | 15 31 55.07 | 2.1429 | 21 56 22.8 | 9.855 |
| 7 | 15 34 3.84 | 2.1494 | 22 6 11.2 | 9.757 |
| 8 | 15 36 13.00 | 2.1559 | 22 15 53.6 | 9.657 |
| 9 | 15 38 22.55 | 2.1624 | 22 25 30.1 | 9.557 |
| 10 | 15 40 32.49 | 2.1689 | 22 35 0.5 | 9.456 |
| 11 | 15 42 42.82 | 2.1754 | 22 44 24.8 | 9.352 |
| 12 | 15 44 53.54 | 2.1820 | 22 53 42.8 | 9.247 |
| 13 | 15 47 4.66 | 2.1886 | 23 2 54.5 | 9.142 |
| 14 | 15 49 16.17 | 2.1951 | 23 11 59.8 | 9.034 |
| 15 | 15 51 28.07 | 2.2016 | 23 20 58.6 | 8.926 |
| 16 | 15 53 40.36 | 2.2081 | 23 29 50.9 | 8.816 |
| 17 | 15 55 53.04 | 2.2146 | 23 38 36.5 | 8.704 |
| 18 | 15 58 6.11 | 2.2211 | 23 47 15.4 | 8.592 |
| 19 | 16 0 19.57 | 2.2276 | 23 55 47.5 | 8.477 |
| 20 | 16 2 33.42 | 2.2340 | 24 4 12.7 | 8.362 |
| 21 | 16 4 47.65 | 2.2404 | 24 12 31.0 | 8.246 |
| 22 | 16 7 2.27 | 2.2469 | 24 20 42.3 | 8.128 |
| 23 | 16 9 17.28 | 2.2533 | S.24 28 46.4 | 8.008 |

### TUESDAY 20.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 16 11 32.67 | 2.2597 | S.24 36 43.3 | 7.887 |
| 1 | 16 13 48.44 | 2.2660 | 24 44 32.9 | 7.766 |
| 2 | 16 16 4.59 | 2.2724 | 24 52 15.2 | 7.643 |
| 3 | 16 18 21.13 | 2.2787 | 24 59 50.1 | 7.519 |
| 4 | 16 20 38.04 | 2.2850 | 25 7 17.5 | 7.393 |
| 5 | 16 22 55.33 | 2.2912 | 25 14 37.3 | 7.266 |
| 6 | 16 25 12.99 | 2.2974 | 25 21 49.4 | 7.137 |
| 7 | 16 27 31.02 | 2.3035 | 25 28 53.8 | 7.008 |
| 8 | 16 29 49.41 | 2.3096 | 25 35 50.4 | 6.877 |
| 9 | 16 32 8.17 | 2.3157 | 25 42 39.1 | 6.746 |
| 10 | 16 34 27.29 | 2.3217 | 25 49 19.9 | 6.612 |
| 11 | 16 36 46.77 | 2.3276 | 25 55 52.6 | 6.478 |
| 12 | 16 39 6.60 | 2.3334 | 26 2 17.3 | 6.343 |
| 13 | 16 41 26.78 | 2.3393 | 26 8 33.8 | 6.206 |
| 14 | 16 43 47.31 | 2.3451 | 26 14 42.0 | 6.067 |
| 15 | 16 46 8.19 | 2.3508 | 26 20 41.9 | 5.928 |
| 16 | 16 48 29.41 | 2.3564 | 26 26 33.4 | 5.787 |
| 17 | 16 50 50.96 | 2.3620 | 26 32 16.4 | 5.646 |
| 18 | 16 53 12.85 | 2.3676 | 26 37 50.9 | 5.503 |
| 19 | 16 55 35.07 | 2.3730 | 26 43 16.8 | 5.359 |
| 20 | 16 57 57.61 | 2.3783 | 26 48 34.0 | 5.214 |
| 21 | 17 0 20.46 | 2.3835 | 26 53 42.5 | 5.068 |
| 22 | 17 2 43.63 | 2.3887 | 26 58 42.2 | 4.921 |
| 23 | 17 5 7.10 | 2.3938 | 27 3 33.0 | 4.772 |
| 24 | 17 7 30.88 | 2.3988 | S.27 8 14.8 | 4.622 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### WEDNESDAY 21.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 17 7 30.88 | 2.3988 | S.27 8 14.8 | 4.622 |
| 1 | 17 9 54.96 | 2.4038 | 27 12 47.7 | 4.472 |
| 2 | 17 12 19.33 | 2.4086 | 27 17 11.5 | 4.321 |
| 3 | 17 14 43.99 | 2.4133 | 27 21 26.2 | 4.168 |
| 4 | 17 17 8.93 | 2.4180 | 27 25 31.7 | 4.015 |
| 5 | 17 19 34.15 | 2.4225 | 27 29 28.0 | 3.861 |
| 6 | 17 21 59.63 | 2.4269 | 27 33 15.0 | 3.706 |
| 7 | 17 24 25.38 | 2.4313 | 27 36 52.7 | 3.549 |
| 8 | 17 26 51.38 | 2.4355 | 27 40 20.9 | 3.392 |
| 9 | 17 29 17.64 | 2.4397 | 27 43 39.7 | 3.234 |
| 10 | 17 31 44.15 | 2.4438 | 27 46 49.0 | 3.075 |
| 11 | 17 34 10.89 | 2.4476 | 27 49 48.7 | 2.915 |
| 12 | 17 36 37.86 | 2.4513 | 27 52 38.8 | 2.755 |
| 13 | 17 39 5.05 | 2.4550 | 27 55 19.3 | 2.593 |
| 14 | 17 41 32.46 | 2.4587 | 27 57 50.0 | 2.431 |
| 15 | 17 44 0.09 | 2.4622 | 28 0 11.0 | 2.268 |
| 16 | 17 46 27.92 | 2.4655 | 28 2 22.2 | 2.105 |
| 17 | 17 48 55.95 | 2.4687 | 28 4 23.6 | 1.941 |
| 18 | 17 51 24.17 | 2.4718 | 28 6 15.1 | 1.776 |
| 19 | 17 53 52.57 | 2.4748 | 28 7 56.7 | 1.610 |
| 20 | 17 56 21.14 | 2.4775 | 28 9 28.3 | 1.444 |
| 21 | 17 58 49.87 | 2.4802 | 28 10 50.0 | 1.278 |
| 22 | 18 1 18.76 | 2.4828 | 28 12 1.7 | 1.111 |
| 23 | 18 3 47.81 | 2.4853 | S.28 13 3.3 | 0.943 |

### THURSDAY 22.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination. ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 18 6 17.00 | 2.4877 | S.28 13 54.8 | 0.774 |
| 1 | 18 8 46.33 | 2.4898 | 28 14 36.2 | 0.606 |
| 2 | 18 11 15.78 | 2.4918 | 28 15 7.5 | 0.437 |
| 3 | 18 13 45.34 | 2.4936 | 28 15 28.6 | 0.267 |
| 4 | 18 16 15.01 | 2.4954 | 28 15 39.5 | 0.097 |
| 5 | 18 18 44.79 | 2.4972 | 28 15 40.2 | 0.073 |
| 6 | 18 21 14.67 | 2.4987 | 28 15 30.7 | 0.244 |
| 7 | 18 23 44.63 | 2.5000 | 28 15 10.9 | 0.415 |
| 8 | 18 26 14.67 | 2.5013 | 28 14 40.9 | 0.586 |
| 9 | 18 28 44.78 | 2.5023 | 28 14 0.6 | 0.757 |
| 10 | 18 31 14.95 | 2.5033 | 28 13 10.0 | 0.929 |
| 11 | 18 33 45.18 | 2.5042 | 28 12 9.1 | 1.101 |
| 12 | 18 36 15.45 | 2.5048 | 28 10 57.9 | 1.273 |
| 13 | 18 38 45.76 | 2.5054 | 28 9 36.4 | 1.445 |
| 14 | 18 41 16.10 | 2.5058 | 28 8 4.5 | 1.617 |
| 15 | 18 43 46.46 | 2.5061 | 28 6 22.3 | 1.789 |
| 16 | 18 46 16.83 | 2.5062 | 28 4 29.8 | 1.961 |
| 17 | 18 48 47.20 | 2.5063 | 28 2 27.0 | 2.133 |
| 18 | 18 51 17.58 | 2.5062 | 28 0 13.8 | 2.305 |
| 19 | 18 53 47.95 | 2.5059 | 27 57 50.3 | 2.477 |
| 20 | 18 56 18.29 | 2.5055 | 27 55 16.5 | 2.649 |
| 21 | 18 58 48.61 | 2.5050 | 27 52 32.4 | 2.821 |
| 22 | 19 1 18.89 | 2.5043 | 27 49 38.0 | 2.993 |
| 23 | 19 3 49.12 | 2.5035 | 27 46 33.3 | 3.165 |
| 24 | 19 6 19.31 | 2.5027 | S.27 43 18.2 | 3.337 |

### FRIDAY 23.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 19 6 19.31 | 2.5027 | S.27 43 18.2 | 3.337 |
| 1 | 19 8 49.44 | 2.5016 | 27 39 52.9 | 3.507 |
| 2 | 19 11 19.50 | 2.5004 | 27 36 17.4 | 3.677 |
| 3 | 19 13 49.49 | 2.4992 | 27 32 31.6 | 3.847 |
| 4 | 19 16 19.40 | 2.4977 | 27 28 35.6 | 4.019 |
| 5 | 19 18 49.21 | 2.4961 | 27 24 29.4 | 4.188 |
| 6 | 19 21 18.93 | 2.4945 | 27 20 13.1 | 4.357 |
| 7 | 19 23 48.55 | 2.4927 | 27 15 46.6 | 4.526 |
| 8 | 19 26 18.06 | 2.4908 | 27 11 10 0 | 4.694 |
| 9 | 19 28 47.45 | 2.4888 | 27 6 23.3 | 4.862 |
| 10 | 19 31 16.72 | 2.4867 | 27 1 26.5 | 5.030 |
| 11 | 19 33 45.85 | 2.4845 | 26 56 19.7 | 5.196 |
| 12 | 19 36 14.85 | 2.4822 | 26 51 3.0 | 5.362 |
| 13 | 19 38 43.71 | 2.4798 | 26 45 36.3 | 5.527 |
| 14 | 19 41 12.42 | 2.4772 | 26 39 59.7 | 5.693 |
| 15 | 19 43 40.97 | 2.4745 | 26 34 13.1 | 5.856 |
| 16 | 19 46 9.36 | 2.4718 | 26 28 16.7 | 6.022 |
| 17 | 19 48 37.58 | 2.4689 | 26 22 10.5 | 6.185 |
| 18 | 19 51 5.62 | 2.4660 | 26 15 54.6 | 6.347 |
| 19 | 19 53 33.50 | 2.4629 | 26 9 28.9 | 6.508 |
| 20 | 19 56 1.18 | 2.4598 | 26 2 53.6 | 6.669 |
| 21 | 19 58 28.67 | 2.4566 | 25 56 8.6 | 6.829 |
| 22 | 20 0 55.97 | 2.4532 | 25 49 14.1 | 6.988 |
| 23 | 20 3 23.06 | 2.4498 | S.25 42 10.1 | 7.147 |

### SATURDAY 24.

| Hour. | Right Ascension. h. m. s. | Diff. for 1 m. s. | Declination ° ′ ″ | Diff. for 1 m. ″ |
|---|---|---|---|---|
| 0 | 20 5 49.95 | 2.4464 | S.25 34 56.5 | 7.305 |
| 1 | 20 8 16.63 | 2.4429 | 25 27 33.5 | 7.461 |
| 2 | 20 10 43.10 | 2.4393 | 25 20 1.2 | 7.617 |
| 3 | 20 13 9.35 | 2.4356 | 25 12 19.5 | 7.772 |
| 4 | 20 15 35.37 | 2.4319 | 25 4 28.5 | 7.926 |
| 5 | 20 18 1.17 | 2.4281 | 24 56 28.4 | 8.079 |
| 6 | 20 20 26.74 | 2.4242 | 24 48 19.1 | 8.231 |
| 7 | 20 22 52.07 | 2.4202 | 24 40 0.7 | 8.382 |
| 8 | 20 25 17.16 | 2.4162 | 24 31 33.2 | 8.532 |
| 9 | 20 27 42.01 | 2.4122 | 24 22 56.8 | 8.681 |
| 10 | 20 30 6.62 | 2.4080 | 24 14 11.5 | 8.829 |
| 11 | 20 32 30.98 | 2.4038 | 24 5 17.3 | 8.977 |
| 12 | 20 34 55.08 | 2.3996 | 23 56 14.3 | 9.122 |
| 13 | 20 37 18.93 | 2.3954 | 23 47 2.6 | 9.267 |
| 14 | 20 39 42.53 | 2.3911 | 23 37 42.2 | 9.411 |
| 15 | 20 42 5.87 | 2.3868 | 23 28 13.3 | 9.553 |
| 16 | 20 44 28.95 | 2.3825 | 23 18 35.9 | 9.694 |
| 17 | 20 46 51.77 | 2.3781 | 23 8 50.0 | 9.835 |
| 18 | 20 49 14.32 | 2.3737 | 22 58 55.7 | 9.974 |
| 19 | 20 51 36.61 | 2.3693 | 22 48 53.1 | 10.112 |
| 20 | 20 53 58.63 | 2.3647 | 22 38 42.3 | 10.248 |
| 21 | 20 56 20.37 | 2.3601 | 22 28 23.3 | 10.384 |
| 22 | 20 58 41.84 | 2.3556 | 22 17 56.2 | 10.518 |
| 23 | 21 1 3.04 | 2.3511 | 22 7 21.1 | 10.652 |
| 24 | 21 3 23.97 | 2.3466 | S.21 56 38.0 | 10.784 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| SUNDAY 25. | | | | | TUESDAY 27. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 3 23.97 | 2.3466 | S.21 56 38.0 | 10.784 | 0 | 22 51 3.52 | 2.1542 | S.11 12 2.3 | 15.547 |
| 1 | 21 5 44.63 | 2.3420 | 21 45 47.0 | 10.915 | 1 | 22 53 12.69 | 2.1515 | 10 56 27.5 | 15.612 |
| 2 | 21 8 5.01 | 2.3373 | 21 34 48.2 | 11.044 | 2 | 22 55 21.70 | 2.1488 | 10 40 48.9 | 15.675 |
| 3 | 21 10 25.11 | 2.3327 | 21 23 41.7 | 11.172 | 3 | 22 57 30.55 | 2.1462 | 10 25 6.5 | 15.737 |
| 4 | 21 12 44.93 | 2.3281 | 21 12 27.5 | 11.299 | 4 | 22 59 39.24 | 2.1437 | 10 9 20.4 | 15.798 |
| 5 | 21 15 4.48 | 2.3236 | 21 1 5.8 | 11.424 | 5 | 23 1 47.79 | 2.1412 | 9 53 30.7 | 15.857 |
| 6 | 21 17 23.76 | 2.3191 | 20 49 36.6 | 11.549 | 6 | 23 3 56.19 | 2.1388 | 9 37 37.5 | 15.915 |
| 7 | 21 19 42.77 | 2.3145 | 20 37 59.9 | 11.672 | 7 | 23 6 4.45 | 2.1366 | 9 21 40.9 | 15.972 |
| 8 | 21 22 1.50 | 2.3098 | 20 26 15.9 | 11.793 | 8 | 23 8 12.58 | 2.1344 | 9 5 40.9 | 16.027 |
| 9 | 21 24 19.95 | 2.3052 | 20 14 24.7 | 11.913 | 9 | 23 10 20.58 | 2.1323 | 8 49 37.7 | 16.080 |
| 10 | 21 26 38.13 | 2.3007 | 20 2 26.3 | 12.033 | 10 | 23 12 28.45 | 2.1303 | 8 33 31.3 | 16.132 |
| 11 | 21 28 56.04 | 2.2962 | 19 50 20.7 | 12.152 | 11 | 23 14 36.21 | 2.1283 | 8 17 21.8 | 16.182 |
| 12 | 21 31 13.67 | 2.2916 | 19 38 8.1 | 12.268 | 12 | 23 16 43.85 | 2.1263 | 8 1 9.4 | 16.231 |
| 13 | 21 33 31.03 | 2.2871 | 19 25 48.5 | 12.383 | 13 | 23 18 51.37 | 2.1245 | 7 44 54.1 | 16.279 |
| 14 | 21 35 48.12 | 2.2826 | 19 13 22.1 | 12.497 | 14 | 23 20 58.79 | 2.1229 | 7 28 35.9 | 16.326 |
| 15 | 21 38 4.94 | 2.2781 | 19 0 48.9 | 12.609 | 15 | 23 23 6.12 | 2.1213 | 7 12 15.0 | 16.370 |
| 16 | 21 40 21.49 | 2.2737 | 18 48 9.0 | 12.721 | 16 | 23 25 13.35 | 2.1198 | 6 55 51.5 | 16.413 |
| 17 | 21 42 37.78 | 2.2693 | 18 35 22.4 | 12.831 | 17 | 23 27 20.49 | 2.1183 | 6 39 25.4 | 16.455 |
| 18 | 21 44 53.80 | 2.2649 | 18 22 29.3 | 12.939 | 18 | 23 29 27.54 | 2.1168 | 6 22 56.9 | 16.496 |
| 19 | 21 47 9.56 | 2.2605 | 18 9 29.7 | 13.046 | 19 | 23 31 34.51 | 2.1156 | 6 6 26.0 | 16.534 |
| 20 | 21 49 25.06 | 2.2561 | 17 56 23.8 | 13.152 | 20 | 23 33 41.41 | 2.1144 | 5 49 52.8 | 16.572 |
| 21 | 21 51 40.29 | 2.2518 | 17 43 11.5 | 13.257 | 21 | 23 35 48.24 | 2.1133 | 5 33 17.4 | 16.607 |
| 22 | 21 53 55.27 | 2.2475 | 17 29 53.0 | 13.359 | 22 | 23 37 55.00 | 2.1122 | 5 16 39.9 | 16.642 |
| 23 | 21 56 9.99 | 2.2433 | S.17 16 28.4 | 13.461 | 23 | 23 40 1.70 | 2.1112 | S. 5 0 0.4 | 16.675 |
| MONDAY 26. | | | | | WEDNESDAY 28. | | | | |
| 0 | 21 58 24.46 | 2.2390 | S.17 2 57.7 | 13.562 | 0 | 23 42 8.35 | 2.1104 | S. 4 43 18.9 | 16.707 |
| 1 | 22 0 38.67 | 2.2348 | 16 49 21.0 | 13.660 | 1 | 23 44 14.95 | 2.1096 | 4 26 35.6 | 16.737 |
| 2 | 22 2 52.64 | 2.2308 | 16 35 38.5 | 13.757 | 2 | 23 46 21.51 | 2.1089 | 4 9 50.5 | 16.765 |
| 3 | 22 5 6.37 | 2.2268 | 16 21 50.1 | 13.854 | 3 | 23 48 28.02 | 2.1083 | 3 53 3.8 | 16.792 |
| 4 | 22 7 19.85 | 2.2228 | 16 7 56.0 | 13.948 | 4 | 23 50 34.50 | 2.1078 | 3 36 15.5 | 16.817 |
| 5 | 22 9 33.10 | 2.2188 | 15 53 56.3 | 14.042 | 5 | 23 52 40.96 | 2.1074 | 3 19 25.7 | 16.842 |
| 6 | 22 11 46.11 | 2.2148 | 15 39 51.0 | 14.134 | 6 | 23 54 47.39 | 2.1070 | 3 2 34.5 | 16.864 |
| 7 | 22 13 58.88 | 2.2109 | 15 25 40.2 | 14.224 | 7 | 23 56 53.80 | 2.1068 | 2 45 42.0 | 16.885 |
| 8 | 22 16 11.42 | 2.2071 | 15 11 24.1 | 14.313 | 8 | 23 59 0.20 | 2.1067 | 2 28 48.3 | 16.906 |
| 9 | 22 18 23.73 | 2.2034 | 14 57 2.6 | 14.402 | 9 | 0 1 6.60 | 2.1067 | 2 11 53.4 | 16.923 |
| 10 | 22 20 35.82 | 2.1997 | 14 42 35.9 | 14.487 | 10 | 0 3 13.00 | 2.1067 | 1 54 57.5 | 16.939 |
| 11 | 22 22 47.69 | 2.1960 | 14 28 4.1 | 14.572 | 11 | 0 5 19.40 | 2.1068 | 1 38 0.7 | 16.953 |
| 12 | 22 24 59.34 | 2.1923 | 14 13 27.3 | 14.655 | 12 | 0 7 25.81 | 2.1069 | 1 21 3.1 | 16.967 |
| 13 | 22 27 10.77 | 2.1888 | 13 58 45.5 | 14.737 | 13 | 0 9 32.23 | 2.1072 | 1 4 4.7 | 16.978 |
| 14 | 22 29 22.00 | 2.1853 | 13 43 58.8 | 14.818 | 14 | 0 11 38.68 | 2.1077 | 0 47 5.7 | 16.989 |
| 15 | 22 31 33.02 | 2.1819 | 13 29 7.3 | 14.897 | 15 | 0 13 45.15 | 2.1082 | 0 30 6.0 | 16.999 |
| 16 | 22 33 43.82 | 2.1786 | 13 14 11.1 | 14.975 | 16 | 0 15 51.65 | 2.1087 | S. 0 13 5.8 | 17.007 |
| 17 | 22 35 54.44 | 2.1754 | 12 59 10.3 | 15.052 | 17 | 0 17 58.19 | 2.1093 | N. 0 3 54.8 | 17.012 |
| 18 | 22 38 4.87 | 2.1722 | 12 44 4.9 | 15.127 | 18 | 0 20 4.77 | 2.1101 | 0 20 55.6 | 17.015 |
| 19 | 22 40 15.10 | 2.1690 | 12 28 55.1 | 15.200 | 19 | 0 22 11.40 | 2.1109 | 0 37 56.6 | 17.018 |
| 20 | 22 42 25.14 | 2.1658 | 12 13 40.9 | 15.272 | 20 | 0 24 18.08 | 2.1118 | 0 54 57.8 | 17.020 |
| 21 | 22 44 35.00 | 2.1628 | 11 58 22.5 | 15.342 | 21 | 0 26 24.82 | 2.1128 | 1 11 59.0 | 17.019 |
| 22 | 22 46 44.68 | 2.1599 | 11 42 59.9 | 15.412 | 22 | 0 28 31.62 | 2.1139 | 1 29 0.1 | 17.017 |
| 23 | 22 48 54.19 | 2.1570 | 11 27 33.1 | 15.480 | 23 | 0 30 38.49 | 2.1152 | 1 46 1.0 | 17.013 |
| 24 | 22 51 3.52 | 2.1542 | S.11 12 2.3 | 15.547 | 24 | 0 32 45.44 | 2.1165 | N. 2 3 1.7 | 17.008 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 32 45.44 | 2.1166 | N. 2 3 1.7 | 17.008 |
| 1 | 0 34 52.47 | 2.1178 | 2 20 2.0 | 17.001 |
| 2 | 0 36 59.58 | 2.1193 | 2 37 1.8 | 16.992 |
| 3 | 0 39 6.78 | 2.1208 | 2 54 1.1 | 16.983 |
| 4 | 0 41 14.08 | 2.1225 | 3 10 59.8 | 16.972 |
| 5 | 0 43 21.48 | 2.1242 | 3 27 57.7 | 16.958 |
| 6 | 0 45 28.98 | 2.1260 | 3 44 54.8 | 16.943 |
| 7 | 0 47 36.60 | 2.1280 | 4 1 50.9 | 16.927 |
| 8 | 0 49 44.34 | 2.1300 | 4 18 46.0 | 16.909 |
| 9 | 0 51 52.20 | 2.1320 | 4 35 40.0 | 16.890 |
| 10 | 0 54 0.18 | 2.1342 | 4 52 32.8 | 16.868 |
| 11 | 0 56 8.30 | 2.1365 | 5 9 24.2 | 16.845 |
| 12 | 0 58 16.56 | 2.1388 | 5 26 14.2 | 16.820 |
| 13 | 1 0 24.96 | 2.1412 | 5 43 2.6 | 16.793 |
| 14 | 1 2 33.50 | 2.1437 | 5 59 49.4 | 16.766 |
| 15 | 1 4 42.20 | 2.1463 | 6 16 34.6 | 16.737 |
| 16 | 1 6 51.06 | 2.1490 | 6 33 17.9 | 16.706 |
| 17 | 1 9 0.08 | 2.1518 | 6 49 59.3 | 16.673 |
| 18 | 1 11 9.27 | 2.1546 | 7 6 38.7 | 16.639 |
| 19 | 1 13 18.63 | 2.1575 | 7 23 16.0 | 16.602 |
| 20 | 1 15 28.17 | 2.1605 | 7 39 51.0 | 16.564 |
| 21 | 1 17 37.89 | 2.1636 | 7 56 23.7 | 16.525 |
| 22 | 1 19 47.80 | 2.1667 | 8 12 54.0 | 16.483 |
| 23 | 1 21 57.91 | 2.1700 | N. 8 29 21.7 | 16.440 |

### FRIDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 24 8.21 | 2.1733 | N. 8 45 46.8 | 16.396 |
| 1 | 1 26 18.71 | 2.1767 | 9 2 9.2 | 16.349 |
| 2 | 1 28 29.42 | 2.1802 | 9 18 28.7 | 16.301 |
| 3 | 1 30 40.34 | 2.1838 | 9 34 45.3 | 16.251 |
| 4 | 1 32 51.48 | 2.1875 | 9 50 58.8 | 16.199 |
| 5 | 1 35 2.84 | 2.1912 | 10 7 9.2 | 16.147 |
| 6 | 1 37 14.42 | 2.1949 | 10 23 16.4 | 16.092 |
| 7 | 1 39 26.22 | 2.1987 | 10 39 20.2 | 16.034 |
| 8 | 1 41 38.26 | 2.2027 | 10 55 20.5 | 15.976 |
| 9 | 1 43 50.54 | 2.2067 | 11 11 17.3 | 15.916 |
| 10 | 1 46 3.06 | 2.2107 | 11 27 10.4 | 15.854 |
| 11 | 1 48 15.83 | 2.2148 | 11 42 59.8 | 15.790 |
| 12 | 1 50 28.84 | 2.2189 | 11 58 45.2 | 15.724 |
| 13 | 1 52 42.10 | 2.2232 | 12 14 26.6 | 15.657 |
| 14 | 1 54 55.62 | 2.2276 | 12 30 4.0 | 15.588 |
| 15 | 1 57 9.41 | 2.2320 | 12 45 37.2 | 15.517 |
| 16 | 1 59 23.46 | 2.2363 | 13 1 6.1 | 15.445 |
| 17 | 2 1 37.77 | 2.2407 | 13 16 30.6 | 15.371 |
| 18 | 2 3 52.35 | 2.2453 | 13 31 50.6 | 15.296 |
| 19 | 2 6 7.21 | 2.2500 | 13 47 6.0 | 15.217 |
| 20 | 2 8 22.35 | 2.2546 | 14 2 16.6 | 15.137 |
| 21 | 2 10 37.76 | 2.2593 | 14 17 22.4 | 15.056 |
| 22 | 2 12 53.46 | 2.2641 | 14 32 23.3 | 14.972 |
| 23 | 2 15 9.45 | 2.2689 | 14 47 19.1 | 14.887 |
| 24 | 2 17 25.73 | 2.2738 | N.15 2 9.8 | 14.801 |

### SATURDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 17 25.73 | 2.2738 | N.15 2 9.8 | 14.801 |
| 1 | 2 19 42.30 | 2.2786 | 15 16 55.2 | 14.712 |
| 2 | 2 21 59.16 | 2.2836 | 15 31 35.2 | 14.622 |
| 3 | 2 24 16.32 | 2.2885 | 15 46 9.8 | 14.530 |
| 4 | 2 26 33.78 | 2.2935 | 16 0 38.8 | 14.436 |
| 5 | 2 28 51.54 | 2.2986 | 16 15 2.1 | 14.340 |
| 6 | 2 31 9.61 | 2.3037 | 16 29 19.6 | 14.242 |
| 7 | 2 33 27.99 | 2.3088 | 16 43 31.2 | 14.143 |
| 8 | 2 35 46.67 | 2.3139 | 16 57 36.8 | 14.042 |
| 9 | 2 38 5.66 | 2.3191 | 17 11 36.3 | 13.940 |
| 10 | 2 40 24.96 | 2.3243 | 17 25 29.6 | 13.836 |
| 11 | 2 42 44.57 | 2.3296 | 17 39 16.6 | 13.730 |
| 12 | 2 45 4.50 | 2.3348 | 17 52 57.2 | 13.622 |
| 13 | 2 47 24.74 | 2.3400 | 18 6 31.3 | 13.512 |
| 14 | 2 49 45.30 | 2.3452 | 18 19 58.7 | 13.401 |
| 15 | 2 52 6.17 | 2.3505 | 18 33 19.4 | 13.287 |
| 16 | 2 54 27.36 | 2.3558 | 18 46 33.2 | 13.172 |
| 17 | 2 56 48.87 | 2.3612 | 18 59 40.1 | 13.056 |
| 18 | 2 59 10.71 | 2.3666 | 19 12 40.0 | 12.938 |
| 19 | 3 1 32.86 | 2.3719 | 19 25 32.7 | 12.818 |
| 20 | 3 3 55.33 | 2.3772 | 19 38 18.2 | 12.697 |
| 21 | 3 6 18.12 | 2.3825 | 19 50 56.3 | 12.573 |
| 22 | 3 8 41.23 | 2.3878 | 20 3 27.0 | 12.448 |
| 23 | 3 11 4.65 | 2.3930 | N.20 15 50.1 | 12.322 |

### SUNDAY, JUNE 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 3 13 28.39 | 2.3983 | N.20 28 5.6 | 12.194 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ● New Moon, . . | 4 | 2 | 42.3 |
| ☽ First Quarter, . | 11 | 8 | 45.2 |
| ○ Full Moon, . . | 19 | 11 | 56.6 |
| ☾ Last Quarter, . . | 26 | 17 | 33.9 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . | 2 | 6.7 |
| ☾ Apogee, . . . . | 14 | 7.7 |
| ☾ Perigee, . . . . | 30 | 0.0 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L of Diff. | IIIh | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Antares | W. | 110 14 19 | 2109 | 112 5 4 | 2103 | 113 55 58 | 2098 | 115 47 0 | 2093 |
| | *a* Aquilæ | W. | 64 13 4 | 3189 | 65 39 26 | 3153 | 67 6 32 | 3119 | 68 34 19 | 3087 |
| | Sun | E. | 43 1 57 | 2408 | 41 18 33 | 2401 | 39 34 59 | 2397 | 37 51 17 | 2391 |
| 6 | Sun | W. | 25 35 46 | 2647 | 27 13 37 | 2663 | 28 51 7 | 2679 | 30 28 15 | 2696 |
| | Regulus | E. | 76 24 10 | 2337 | 74 39 5 | 2354 | 72 54 24 | 2370 | 71 10 6 | 2387 |
| | Mars | E. | 111 47 48 | 2299 | 110 1 47 | 2315 | 108 16 10 | 2332 | 106 30 57 | 2348 |
| 7 | Sun | W. | 38 28 7 | 2786 | 40 2 53 | 2804 | 41 37 16 | 2823 | 43 11 15 | 2842 |
| | Regulus | E. | 62 34 46 | 2474 | 60 52 56 | 2492 | 59 11 31 | 2510 | 57 30 31 | 2528 |
| | Mars | E. | 97 51 3 | 2436 | 96 8 20 | 2455 | 94 26 3 | 2472 | 92 44 11 | 2490 |
| | Spica | E. | 116 36 19 | 2465 | 114 54 17 | 2483 | 113 12 40 | 2500 | 111 31 27 | 2518 |
| 8 | Sun | W. | 50 55 5 | 2935 | 52 26 39 | 2954 | 53 57 49 | 2972 | 55 28 37 | 2991 |
| | Saturn | W. | 12 28 47 | 3058 | 13 57 48 | 2990 | 15 28 13 | 2946 | 16 59 34 | 2917 |
| | Regulus | E. | 49 11 52 | 2620 | 47 33 24 | 2638 | 45 55 21 | 2657 | 44 17 44 | 2675 |
| | Mars | E. | 84 21 9 | 2581 | 82 41 48 | 2599 | 81 2 51 | 2616 | 79 24 18 | 2635 |
| | Spica | E. | 103 11 27 | 2606 | 101 32 39 | 2623 | 99 54 15 | 2640 | 98 16 14 | 2658 |
| 9 | Sun | W. | 62 56 51 | 3082 | 64 25 23 | 3099 | 65 53 35 | 3115 | 67 21 26 | 3131 |
| | Saturn | W. | 24 41 42 | 2886 | 26 14 19 | 2891 | 27 46 50 | 2897 | 29 19 13 | 2904 |
| | Regulus | E. | 36 15 44 | 2767 | 34 40 33 | 2786 | 33 5 47 | 2805 | 31 31 25 | 2823 |
| | Mars | E. | 71 17 30 | 2720 | 69 41 17 | 2736 | 68 5 26 | 2753 | 66 29 57 | 2769 |
| | Spica | E. | 90 11 52 | 2741 | 88 36 6 | 2757 | 87 0 40 | 2772 | 85 25 35 | 2788 |
| 10 | Sun | W. | 74 35 48 | 3211 | 76 1 44 | 3225 | 77 27 23 | 3240 | 78 52 46 | 3253 |
| | Saturn | W. | 36 58 30 | 2951 | 38 29 45 | 2961 | 40 0 47 | 2971 | 41 31 36 | 2981 |
| | Pollux | W. | 13 17 15 | 2877 | 14 50 3 | 2888 | 16 22 37 | 2899 | 17 54 57 | 2909 |
| | Mars | E. | 58 37 34 | 2846 | 57 4 4 | 2859 | 55 30 52 | 2872 | 53 57 57 | 2885 |
| | Spica | E. | 77 35 11 | 2860 | 76 2 1 | 2874 | 74 29 9 | 2887 | 72 56 34 | 2900 |
| 11 | Sun | W. | 85 55 48 | 3316 | 87 19 41 | 3327 | 88 43 21 | 3338 | 90 6 49 | 3348 |
| | Saturn | W. | 49 2 37 | 3029 | 50 32 14 | 3038 | 52 1 40 | 3047 | 53 30 55 | 3056 |
| | Pollux | W. | 25 33 18 | 2961 | 27 4 20 | 2970 | 28 35 11 | 2979 | 30 5 50 | 2989 |
| | Mars | E. | 46 17 28 | 2946 | 44 46 7 | 2957 | 43 15 0 | 2967 | 41 44 6 | 2977 |
| | Spica | E. | 65 17 32 | 2958 | 63 46 26 | 2969 | 62 15 34 | 2977 | 60 44 53 | 2988 |
| | Antares | E. | 111 10 29 | 2954 | 109 39 19 | 2964 | 108 8 22 | 2974 | 106 37 37 | 2984 |
| 12 | Sun | W. | 97 1 23 | 3392 | 98 23 49 | 3399 | 99 46 7 | 3405 | 101 8 18 | 3411 |
| | Saturn | W. | 60 54 46 | 3091 | 62 23 7 | 3096 | 63 51 21 | 3102 | 65 19 28 | 3107 |
| | Pollux | W. | 37 36 25 | 3026 | 39 6 5 | 3033 | 40 35 37 | 3039 | 42 5 2 | 3044 |
| | Mars | E. | 34 12 31 | 3020 | 32 42 43 | 3028 | 31 13 5 | 3034 | 29 43 35 | 3040 |
| | Spica | E. | 53 14 19 | 3028 | 51 44 41 | 3035 | 50 15 12 | 3041 | 48 45 50 | 3047 |
| | Antares | E. | 99 6 36 | 3024 | 97 36 53 | 3030 | 96 7 18 | 3036 | 94 37 50 | 3042 |
| 13 | Sun | W. | 107 57 40 | 3434 | 109 19 18 | 3438 | 110 40 52 | 3440 | 112 2 23 | 3443 |
| | Saturn | W. | 72 38 39 | 3127 | 74 6 16 | 3129 | 75 33 50 | 3131 | 77 1 22 | 3133 |
| | Pollux | W. | 49 30 34 | 3065 | 50 59 28 | 3068 | 52 28 17 | 3070 | 53 57 3 | 3072 |
| | Spica | E. | 41 20 42 | 3070 | 39 51 55 | 3074 | 38 23 14 | 3077 | 36 54 36 | 3080 |
| | Antares | E. | 87 12 4 | 3063 | 85 43 9 | 3066 | 84 14 18 | 3068 | 82 45 30 | 3070 |
| 14 | Sun | W. | 118 49 24 | 3447 | 120 10 48 | 3446 | 121 32 13 | 3445 | 122 53 39 | 3445 |
| | Saturn | W. | 84 18 34 | 3136 | 85 46 0 | 3135 | 87 13 27 | 3134 | 88 40 56 | 3133 |
| | Pollux | W. | 61 20 32 | 3075 | 62 49 12 | 3074 | 64 17 53 | 3073 | 65 46 35 | 3072 |
| | Regulus | W. | 24 56 51 | 3127 | 26 24 28 | 3122 | 27 52 11 | 3116 | 29 20 1 | 3110 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Antares | W. | 117 38 10 | 2088 | 119 29 27 | 2085 | 121 20 49 | 2082 | 123 12 16 | 2079 |
| | α Aquilæ | W. | 70 2 44 | 3060 | 71 31 43 | 3035 | 73 1 12 | 3013 | 74 31 9 | 2993 |
| | Sun | E. | 36 7 29 | 2387 | 34 23 35 | 2383 | 32 39 36 | 2380 | 30 55 32 | 2378 |
| 6 | Sun | W. | 32 5 0 | 2713 | 33 41 22 | 2731 | 35 17 21 | 2749 | 36 52 56 | 2767 |
| | Regulus | E. | 69 26 13 | 2404 | 67 42 44 | 2422 | 65 59 40 | 2439 | 64 17 1 | 2456 |
| | Mars | E. | 104 46 8 | 2366 | 103 1 44 | 2383 | 101 17 45 | 2401 | 99 34 11 | 2419 |
| 7 | Sun | W. | 44 44 49 | 2860 | 46 17 59 | 2879 | 47 50 45 | 2898 | 49 23 7 | 2916 |
| | Regulus | E. | 55 49 57 | 2546 | 54 9 48 | 2564 | 52 30 4 | 2583 | 50 50 46 | 2601 |
| | Mars | E. | 91 2 44 | 2508 | 89 21 42 | 2527 | 87 41 6 | 2545 | 86 0 55 | 2563 |
| | Spica | E. | 109 50 39 | 2535 | 108 10 15 | 2553 | 106 30 15 | 2570 | 104 50 39 | 2588 |
| 8 | Sun | W. | 56 59 1 | 3009 | 58 29 2 | 3027 | 59 58 41 | 3046 | 61 27 56 | 3063 |
| | Saturn | W. | 18 31 31 | 2899 | 20 3 51 | 2890 | 21 36 23 | 2884 | 23 9 2 | 2883 |
| | Regulus | E. | 42 40 31 | 2694 | 41 3 43 | 2712 | 39 27 19 | 2730 | 37 51 19 | 2749 |
| | Mars | E. | 77 46 10 | 2652 | 76 8 25 | 2669 | 74 31 4 | 2687 | 72 54 6 | 2703 |
| | Spica | E. | 96 38 37 | 2674 | 95 1 22 | 2691 | 93 24 30 | 2707 | 91 48 0 | 2724 |
| 9 | Sun | W. | 68 48 58 | 3148 | 70 16 9 | 3164 | 71 43 1 | 3180 | 73 9 34 | 3195 |
| | Saturn | W. | 30 51 27 | 2912 | 32 23 30 | 2921 | 33 55 22 | 2931 | 35 27 3 | 2941 |
| | Regulus | E. | 29 57 27 | 2842 | 28 23 54 | 2862 | 26 50 46 | 2881 | 25 18 3 | 2901 |
| | Mars | E. | 64 54 48 | 2785 | 63 20 0 | 2800 | 61 45 32 | 2815 | 60 11 23 | 2830 |
| | Spica | E. | 83 50 51 | 2803 | 82 16 27 | 2818 | 80 42 23 | 2833 | 79 8 38 | 2847 |
| 10 | Sun | W. | 80 17 53 | 3266 | 81 42 44 | 3279 | 83 7 20 | 3292 | 84 31 41 | 3304 |
| | Saturn | W. | 43 2 13 | 2991 | 44 32 37 | 3001 | 46 2 49 | 3010 | 47 32 49 | 3020 |
| | Pollux | W. | 19 27 4 | 2920 | 20 58 57 | 2931 | 22 30 37 | 2941 | 24 2 4 | 2951 |
| | Mars | E. | 52 25 19 | 2898 | 50 52 58 | 2911 | 49 20 53 | 2923 | 47 49 3 | 2935 |
| | Spica | E. | 71 24 15 | 2912 | 69 52 12 | 2924 | 68 20 24 | 2936 | 66 48 51 | 2947 |
| 11 | Sun | W. | 91 30 6 | 3358 | 92 53 11 | 3367 | 94 16 5 | 3376 | 95 38 49 | 3385 |
| | Saturn | W. | 54 59 59 | 3063 | 56 28 54 | 3070 | 57 57 40 | 3078 | 59 26 17 | 3084 |
| | Pollux | W. | 31 36 17 | 2997 | 33 6 33 | 3005 | 34 36 40 | 3013 | 36 6 37 | 3020 |
| | Mars | E. | 40 13 24 | 2986 | 38 42 54 | 2996 | 37 12 36 | 3005 | 35 42 29 | 3012 |
| | Spica | E. | 59 14 25 | 2997 | 57 44 8 | 3005 | 56 14 2 | 3014 | 54 44 6 | 3021 |
| | Antares | E. | 105 7 4 | 2993 | 103 36 42 | 3001 | 102 6 30 | 3009 | 100 36 28 | 3017 |
| 12 | Sun | W. | 102 30 22 | 3417 | 103 52 19 | 3422 | 105 14 11 | 3426 | 106 35 58 | 3431 |
| | Saturn | W. | 66 47 29 | 3112 | 68 15 24 | 3117 | 69 43 13 | 3120 | 71 10 58 | 3124 |
| | Pollux | W. | 43 34 20 | 3050 | 45 3 31 | 3054 | 46 32 37 | 3059 | 48 1 37 | 3061 |
| | Mars | E. | 28 14 12 | 3047 | 26 44 57 | 3052 | 25 15 49 | 3057 | 23 46 47 | 3062 |
| | Spica | E. | 47 16 36 | 3053 | 45 47 29 | 3058 | 44 18 28 | 3063 | 42 49 33 | 3066 |
| | Antares | E. | 93 8 29 | 3047 | 91 39 15 | 3052 | 90 10 6 | 3056 | 88 41 3 | 3060 |
| 13 | Sun | W. | 113 23 51 | 3446 | 114 45 16 | 3447 | 116 6 40 | 3448 | 117 28 2 | 3448 |
| | Saturn | W. | 78 28 51 | 3135 | 79 56 18 | 3136 | 81 23 44 | 3137 | 82 51 9 | 3137 |
| | Pollux | W. | 55 25 47 | 3073 | 56 54 29 | 3074 | 58 23 10 | 3074 | 59 51 51 | 3075 |
| | Spica | E. | 35 26 2 | 3082 | 33 57 29 | 3084 | 32 29 0 | 3086 | 31 0 32 | 3087 |
| | Antares | E. | 81 16 44 | 3072 | 79 48 0 | 3073 | 78 19 17 | 3073 | 76 50 35 | 3074 |
| 14 | Sun | W. | 124 15 5 | 3444 | 125 36 32 | 3443 | 126 58 1 | 3441 | 128 19 31 | 3440 |
| | Saturn | W. | 90 8 25 | 3131 | 91 35 57 | 3129 | 93 3 31 | 3126 | 94 31 9 | 3124 |
| | Pollux | W. | 67 15 19 | 3070 | 68 44 5 | 3068 | 70 12 54 | 3065 | 71 41 46 | 3062 |
| | Regulus | W. | 30 47 58 | 3106 | 32 16 1 | 3100 | 33 44 11 | 3096 | 35 12 27 | 3090 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | | | P. L. of Diff. | IIIh. | | | P. L. of Diff. | VIh. | | | P. L. of Diff. | IXh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 14 | Spica | E. | 29 | 32 | 7 | 3067 | 28 | 3 | 43 | 3068 | 26 | 35 | 18 | 3069 | 25 | 6 | 55 | 3070 |
| | Antares | E. | 75 | 21 | 54 | 3074 | 73 | 53 | 13 | 3073 | 72 | 24 | 31 | 3072 | 70 | 55 | 47 | 3071 |
| 15 | Saturn | W. | 95 | 58 | 49 | 3121 | 97 | 26 | 33 | 3117 | 98 | 54 | 22 | 3114 | 100 | 22 | 15 | 3110 |
| | Pollux | W. | 73 | 10 | 42 | 3059 | 74 | 39 | 42 | 3056 | 76 | 8 | 46 | 3052 | 77 | 37 | 55 | 3047 |
| | Regulus | W. | 36 | 40 | 49 | 3085 | 38 | 9 | 17 | 3079 | 39 | 37 | 52 | 3073 | 41 | 6 | 34 | 3066 |
| | Antares | E. | 63 | 31 | 34 | 3058 | 62 | 2 | 33 | 3055 | 60 | 33 | 28 | 3051 | 59 | 4 | 18 | 3046 |
| | *a* Aquilæ | E. | 110 | 54 | 0 | 4044 | 109 | 43 | 4 | 4022 | 108 | 31 | 46 | 4001 | 107 | 20 | 7 | 3981 |
| 16 | Pollux | W. | 85 | 5 | 7 | 3021 | 86 | 34 | 54 | 3015 | 88 | 4 | 48 | 3009 | 89 | 34 | 50 | 3003 |
| | Regulus | W. | 48 | 31 | 48 | 3037 | 50 | 1 | 15 | 3030 | 51 | 30 | 50 | 3023 | 53 | 0 | 34 | 3016 |
| | Antares | E. | 51 | 37 | 1 | 3022 | 50 | 7 | 15 | 3015 | 48 | 37 | 21 | 3009 | 47 | 7 | 19 | 3001 |
| | *a* Aquilæ | E. | 101 | 17 | 18 | 3897 | 100 | 3 | 55 | 3883 | 98 | 50 | 18 | 3869 | 97 | 36 | 27 | 3856 |
| 17 | Pollux | W. | 97 | 7 | 8 | 2967 | 98 | 38 | 2 | 2958 | 100 | 9 | 7 | 2951 | 101 | 40 | 21 | 2942 |
| | Regulus | W. | 60 | 31 | 31 | 2978 | 62 | 2 | 11 | 2969 | 63 | 33 | 2 | 2962 | 65 | 4 | 3 | 2953 |
| | Mars | W. | 25 | 15 | 19 | 2986 | 26 | 45 | 50 | 2978 | 28 | 16 | 30 | 2970 | 29 | 47 | 20 | 2963 |
| | Antares | E. | 39 | 34 | 57 | 2966 | 38 | 4 | 2 | 2959 | 36 | 32 | 58 | 2951 | 35 | 1 | 44 | 2943 |
| | *a* Aquilæ | E. | 91 | 24 | 12 | 3805 | 90 | 9 | 15 | 3798 | 88 | 54 | 11 | 3792 | 87 | 39 | 0 | 3785 |
| | Fomalhaut | E. | 120 | 48 | 55 | 3227 | 119 | 23 | 18 | 3211 | 117 | 57 | 22 | 3197 | 116 | 31 | 9 | 3183 |
| 18 | Pollux | W. | 109 | 19 | 11 | 2900 | 110 | 51 | 30 | 2891 | 112 | 24 | 0 | 2883 | 113 | 56 | 41 | 2873 |
| | Regulus | W. | 72 | 41 | 52 | 2909 | 74 | 13 | 59 | 2901 | 75 | 46 | 17 | 2891 | 77 | 18 | 47 | 2882 |
| | Mars | W. | 37 | 23 | 58 | 2922 | 38 | 55 | 49 | 2914 | 40 | 27 | 50 | 2905 | 42 | 0 | 2 | 2895 |
| | Spica | W. | 18 | 40 | 11 | 2929 | 20 | 11 | 53 | 2916 | 21 | 43 | 52 | 2904 | 23 | 16 | 6 | 2892 |
| | Antares | E. | 27 | 23 | 2 | 2901 | 25 | 50 | 45 | 2893 | 24 | 18 | 17 | 2884 | 22 | 45 | 38 | 2876 |
| | *a* Aquilæ | E. | 81 | 21 | 38 | 3765 | 80 | 5 | 59 | 3764 | 78 | 50 | 19 | 3765 | 77 | 34 | 40 | 3766 |
| | Fomalhaut | E. | 109 | 15 | 50 | 3114 | 107 | 47 | 58 | 3102 | 106 | 19 | 51 | 3090 | 104 | 51 | 29 | 3078 |
| 19 | Regulus | W. | 85 | 4 | 14 | 2836 | 86 | 37 | 55 | 2826 | 88 | 11 | 50 | 2818 | 89 | 45 | 55 | 2808 |
| | Mars | W. | 49 | 43 | 49 | 2853 | 51 | 17 | 8 | 2844 | 52 | 50 | 39 | 2835 | 54 | 24 | 22 | 2826 |
| | Spica | W. | 31 | 0 | 53 | 2838 | 32 | 34 | 32 | 2828 | 34 | 8 | 24 | 2818 | 35 | 42 | 29 | 2808 |
| | *a* Aquilæ | E. | 71 | 17 | 18 | 3794 | 70 | 2 | 10 | 3805 | 68 | 47 | 13 | 3818 | 67 | 32 | 29 | 3830 |
| | Fomalhaut | E. | 97 | 26 | 7 | 3022 | 95 | 56 | 22 | 3012 | 94 | 26 | 24 | 3002 | 92 | 56 | 14 | 2992 |
| | *a* Pegasi | E. | 117 | 45 | 7 | 3252 | 116 | 19 | 59 | 3232 | 114 | 54 | 28 | 3213 | 113 | 28 | 34 | 3194 |
| 20 | Regulus | W. | 97 | 39 | 26 | 2761 | 99 | 14 | 45 | 2752 | 100 | 50 | 16 | 2743 | 102 | 25 | 59 | 2734 |
| | Mars | W. | 62 | 15 | 47 | 2782 | 63 | 50 | 39 | 2772 | 65 | 25 | 43 | 2764 | 67 | 0 | 58 | 2755 |
| | Spica | W. | 43 | 36 | 11 | 2758 | 45 | 11 | 34 | 2748 | 46 | 47 | 10 | 2739 | 48 | 22 | 59 | 2730 |
| | *a* Aquilæ | E. | 61 | 23 | 5 | 3936 | 60 | 10 | 22 | 3965 | 58 | 58 | 8 | 4000 | 57 | 46 | 28 | 4036 |
| | Fomalhaut | E. | 85 | 22 | 21 | 2947 | 83 | 51 | 2 | 2939 | 82 | 19 | 32 | 2931 | 80 | 47 | 53 | 2924 |
| | *a* Pegasi | E. | 106 | 13 | 51 | 3111 | 104 | 45 | 56 | 3097 | 103 | 17 | 43 | 3083 | 101 | 49 | 13 | 3069 |
| | Jupiter | E. | 116 | 35 | 30 | 2813 | 115 | 1 | 19 | 2804 | 113 | 26 | 56 | 2795 | 111 | 52 | 21 | 2786 |
| 21 | Regulus | W. | 110 | 27 | 34 | 2690 | 112 | 4 | 28 | 2681 | 113 | 41 | 34 | 2672 | 115 | 18 | 52 | 2663 |
| | Mars | W. | 75 | 0 | 8 | 2711 | 76 | 36 | 33 | 2703 | 78 | 13 | 9 | 2695 | 79 | 49 | 56 | 2686 |
| | Spica | W. | 56 | 25 | 9 | 2683 | 58 | 2 | 12 | 2673 | 59 | 39 | 28 | 2664 | 61 | 16 | 56 | 2655 |
| | *a* Aquilæ | E. | 51 | 58 | 24 | 4289 | 50 | 51 | 21 | 4357 | 49 | 45 | 21 | 4435 | 48 | 40 | 31 | 4519 |
| | Fomalhaut | E. | 73 | 7 | 25 | 2893 | 71 | 34 | 57 | 2887 | 70 | 2 | 22 | 2883 | 68 | 29 | 41 | 2880 |
| | *a* Pegasi | E. | 94 | 22 | 48 | 3012 | 92 | 52 | 50 | 3001 | 91 | 22 | 39 | 2993 | 89 | 52 | 17 | 2984 |
| | Jupiter | E. | 103 | 56 | 19 | 2738 | 102 | 20 | 30 | 2729 | 100 | 44 | 28 | 2720 | 99 | 8 | 16 | 2710 |
| 22 | Mars | W. | 87 | 56 | 42 | 2644 | 89 | 34 | 37 | 2636 | 91 | 12 | 43 | 2628 | 92 | 51 | 0 | 2620 |
| | Spica | W. | 60 | 27 | 17 | 2611 | 71 | 5 | 57 | 2602 | 72 | 44 | 49 | 2593 | 74 | 23 | 53 | 2585 |
| | Antares | W. | 23 | 32 | 57 | 2611 | 25 | 11 | 37 | 2601 | 26 | 50 | 30 | 2593 | 28 | 29 | 35 | 2586 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 14 | Spica | E. | 23 38 33 | 3091 | 22 10 12 | 3092 | 20 41 53 | 3093 | 19 13 35 | 3096 |
| | Antares | E. | 69 27 2 | 3069 | 67 58 14 | 3067 | 66 29 24 | 3065 | 65 0 31 | 3061 |
| 15 | Saturn | W. | 101 50 13 | 3105 | 103 18 16 | 3100 | 104 46 26 | 3096 | 106 14 41 | 3090 |
| | Pollux | W. | 79 7 9 | 3043 | 80 36 29 | 3038 | 82 5 55 | 3033 | 83 35 27 | 3026 |
| | Regulus | W | 42 35 22 | 3063 | 44 4 17 | 3056 | 45 33 20 | 3051 | 47 2 30 | 3044 |
| | Antares | E. | 57 35 2 | 3041 | 56 5 40 | 3037 | 54 36 13 | 3032 | 53 6 40 | 3027 |
| | α Aquilæ | E. | 106 8 9 | 2962 | 104 55 52 | 2944 | 103 43 17 | 2929 | 102 30 26 | 2912 |
| 16 | Pollux | W. | 91 5 0 | 2995 | 92 35 19 | 2989 | 94 5 46 | 2981 | 95 36 23 | 2974 |
| | Regulus | W. | 54 30 28 | 3009 | 56 0 30 | 3001 | 57 30 41 | 2994 | 59 1 1 | 2986 |
| | Antares | E. | 45 37 8 | 2994 | 44 6 48 | 2988 | 42 36 20 | 2981 | 41 5 43 | 2973 |
| | α Aquilæ | E. | 96 22 23 | 3845 | 95 8 7 | 3833 | 93 53 39 | 3822 | 92 39 0 | 3814 |
| 17 | Pollux | W. | 103 11 46 | 2934 | 104 43 21 | 2926 | 106 15 7 | 2918 | 107 47 3 | 2909 |
| | Regulus | W. | 66 35 16 | 2944 | 68 6 39 | 2936 | 69 38 12 | 2927 | 71 9 56 | 2918 |
| | Mars | W. | 31 18 19 | 2955 | 32 49 28 | 2946 | 34 20 48 | 2939 | 35 52 18 | 2931 |
| | Antares | E. | 33 30 20 | 2936 | 31 58 47 | 2927 | 30 27 3 | 2919 | 28 55 8 | 2910 |
| | α Aquilæ | E. | 86 23 42 | 3779 | 85 8 18 | 3774 | 83 52 49 | 3770 | 82 37 15 | 3767 |
| | Fomalhaut | E. | 115 4 38 | 3168 | 113 37 50 | 3153 | 112 10 46 | 3141 | 110 43 26 | 3128 |
| 18 | Pollux | W. | 115 29 34 | 2864 | 117 2 38 | 2855 | 118 35 55 | 2846 | 120 9 22 | 2837 |
| | Regulus | W. | 78 51 29 | 2873 | 80 24 23 | 2864 | 81 57 28 | 2855 | 83 30 45 | 2845 |
| | Mars | W. | 43 32 25 | 2889 | 45 4 59 | 2880 | 46 37 44 | 2871 | 48 10 41 | 2862 |
| | Spica | W. | 24 48 35 | 2881 | 26 21 18 | 2870 | 27 54 15 | 2859 | 29 27 27 | 2848 |
| | Antares | E. | 21 12 49 | 2868 | 19 39 49 | 2860 | 18 6 39 | 2852 | 16 33 18 | 2843 |
| | α Aquilæ | E. | 76 19 2 | 3769 | 75 3 28 | 3773 | 73 47 58 | 3780 | 72 32 35 | 3786 |
| | Fomalhaut | E. | 103 22 53 | 3067 | 101 54 3 | 3055 | 100 24 58 | 3043 | 98 55 39 | 3033 |
| 19 | Regulus | W. | 91 20 13 | 2798 | 92 54 43 | 2789 | 94 29 25 | 2779 | 96 4 20 | 2770 |
| | Mars | W. | 55 58 16 | 2817 | 57 32 21 | 2808 | 59 6 38 | 2799 | 60 41 7 | 2791 |
| | Spica | W. | 37 16 47 | 2797 | 38 51 19 | 2786 | 40 26 3 | 2777 | 42 1 1 | 2768 |
| | α Aquilæ | E. | 66 17 58 | 3847 | 65 3 44 | 3865 | 63 49 49 | 3886 | 62 36 15 | 3910 |
| | Fomalhaut | E. | 91 25 51 | 2982 | 89 55 16 | 2973 | 88 24 29 | 2964 | 86 53 30 | 2955 |
| | α Pegasi | E. | 112 2 18 | 3177 | 110 35 41 | 3160 | 109 8 44 | 3143 | 107 41 27 | 3128 |
| 20 | Regulus | W. | 104 1 55 | 2725 | 105 38 2 | 2716 | 107 14 21 | 2707 | 108 50 52 | 2698 |
| | Mars | W. | 68 36 25 | 2747 | 70 12 3 | 2738 | 71 47 53 | 2729 | 73 23 55 | 2720 |
| | Spica | W. | 49 58 59 | 2719 | 51 35 13 | 2710 | 53 11 39 | 2701 | 54 48 18 | 2692 |
| | α Aquilæ | E. | 56 35 24 | 4077 | 55 25 0 | 4121 | 54 15 19 | 4171 | 53 6 25 | 4227 |
| | Fomalhaut | E. | 79 16 4 | 2916 | 77 44 6 | 2910 | 75 12 0 | 2904 | 74 39 46 | 2898 |
| | α Pegasi | E. | 100 20 26 | 3056 | 98 51 23 | 3045 | 97 22 6 | 3033 | 95 52 34 | 3022 |
| | Jupiter | E. | 110 17 34 | 2775 | 108 42 34 | 2766 | 107 7 22 | 2756 | 105 31 57 | 2747 |
| 21 | Regulus | W. | 116 56 22 | 2654 | 118 34 4 | 2646 | 120 11 57 | 2638 | 121 50 0 | 2630 |
| | Mars | W. | 81 26 55 | 2678 | 83 4 5 | 2669 | 84 41 26 | 2661 | 86 18 58 | 2652 |
| | Spica | W. | 62 54 36 | 2646 | 64 32 28 | 2637 | 66 10 32 | 2628 | 67 48 49 | 2620 |
| | α Aquilæ | E. | 47 36 56 | 4616 | 46 34 44 | 4717 | 45 33 59 | 4831 | 44 34 48 | 4961 |
| | Fomalhaut | E. | 66 56 56 | 2876 | 65 24 7 | 2874 | 63 51 15 | 2872 | 62 18 20 | 2871 |
| | α Pegasi | E. | 88 21 43 | 2975 | 86 50 59 | 2966 | 85 20 4 | 2960 | 83 49 1 | 2954 |
| | Jupiter | E. | 97 31 50 | 2701 | 95 55 13 | 2692 | 94 18 23 | 2683 | 92 41 21 | 2674 |
| 22 | Mars | W. | 94 29 28 | 2612 | 96 8 6 | 2604 | 97 46 55 | 2596 | 99 25 56 | 2588 |
| | Spica | W. | 76 3 8 | 2577 | 77 42 35 | 2569 | 79 22 13 | 2560 | 81 2 3 | 2553 |
| | Antares | W. | 30 8 51 | 2576 | 31 48 19 | 2567 | 33 27 59 | 2559 | 35 7 51 | 2551 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 22 | Fomalhaut | E. | 60 45 24 | 2870 | 59 12 27 | 2871 | 57 39 31 | 2873 | 56 6 38 | 2876 |
| | *a* Pegasi | E. | 82 17 50 | 2947 | 80 46 31 | 2942 | 79 15 5 | 2938 | 77 43 34 | 2933 |
| | Jupiter | E. | 91 4 7 | 2666 | 89 26 41 | 2657 | 87 49 3 | 2648 | 86 11 13 | 2640 |
| 23 | Mars | W. | 101 5 7 | 2580 | 102 44 29 | 2573 | 104 24 1 | 2565 | 106 3 44 | 2557 |
| | Spica | W. | 82 42 4 | 2543 | 84 22 17 | 2535 | 86 2 41 | 2527 | 87 43 16 | 2519 |
| | Antares | W. | 36 47 54 | 2542 | 38 28 9 | 2533 | 40 8 36 | 2525 | 41 49 15 | 2517 |
| | Fomalhaut | E. | 48 23 37 | 2911 | 46 51 32 | 2924 | 45 19 43 | 2939 | 43 48 14 | 2958 |
| | *a* Pegasi | E. | 70 4 55 | 2924 | 68 33 6 | 2924 | 67 1 18 | 2926 | 65 29 32 | 2929 |
| | Jupiter | E. | 77 59 12 | 2598 | 76 20 14 | 2590 | 74 41 5 | 2582 | 73 1 45 | 2573 |
| | *a* Arietis | E. | 111 29 4 | 2600 | 109 50 9 | 2591 | 108 11 1 | 2582 | 106 31 41 | 2572 |
| | Sun | E. | 137 32 17 | 2877 | 135 59 29 | 2868 | 134 26 29 | 2858 | 132 53 17 | 2848 |
| 24 | Spica | W. | 96 9 1 | 2480 | 97 50 43 | 2472 | 99 32 36 | 2464 | 101 14 40 | 2456 |
| | Antares | W. | 50 15 12 | 2477 | 51 56 58 | 2470 | 53 38 54 | 2462 | 55 21 2 | 2454 |
| | *a* Pegasi | E. | 57 52 9 | 2963 | 56 21 10 | 2975 | 54 50 26 | 2989 | 53 19 59 | 3004 |
| | Jupiter | E. | 64 42 13 | 2532 | 63 1 44 | 2524 | 61 21 4 | 2516 | 59 40 13 | 2508 |
| | *a* Arietis | E. | 98 11 54 | 2529 | 96 31 21 | 2521 | 94 50 37 | 2512 | 93 9 41 | 2505 |
| | Sun | E. | 125 4 16 | 2804 | 123 29 53 | 2795 | 121 55 19 | 2787 | 120 20 34 | 2779 |
| 25 | Spica | W. | 109 47 44 | 2418 | 111 30 53 | 2410 | 113 14 13 | 2403 | 114 57 43 | 2396 |
| | Antares | W. | 63 54 24 | 2415 | 65 37 37 | 2408 | 67 21 1 | 2400 | 69 4 36 | 2392 |
| | Jupiter | E. | 51 13 13 | 2469 | 49 31 16 | 2462 | 47 49 9 | 2453 | 46 6 50 | 2446 |
| | *a* Arietis | E. | 84 42 21 | 2467 | 83 0 22 | 2460 | 81 18 12 | 2453 | 79 35 52 | 2446 |
| | Sun | E. | 112 24 0 | 2735 | 110 48 7 | 2728 | 109 12 4 | 2719 | 107 35 50 | 2712 |
| 26 | Antares | W. | 77 45 10 | 2355 | 79 29 49 | 2348 | 81 14 38 | 2341 | 82 59 37 | 2334 |
| | Jupiter | E. | 37 32 37 | 2408 | 35 49 14 | 2401 | 34 5 41 | 2394 | 32 21 58 | 2387 |
| | *a* Arietis | E. | 71 1 51 | 2415 | 69 18 37 | 2409 | 67 35 14 | 2403 | 65 51 43 | 2397 |
| | Sun | E. | 99 32 2 | 2672 | 97 54 45 | 2664 | 96 17 17 | 2657 | 94 39 39 | 2649 |
| 27 | Antares | W. | 91 47 4 | 2301 | 93 33 2 | 2294 | 95 19 10 | 2288 | 97 5 27 | 2281 |
| | *a* Aquilæ | W. | 50 33 47 | 3927 | 51 46 39 | 3843 | 53 0 57 | 3764 | 54 16 37 | 3692 |
| | *a* Arietis | E. | 57 12 21 | 2375 | 55 28 11 | 2373 | 53 43 57 | 2370 | 51 59 39 | 2367 |
| | Sun | E. | 86 28 59 | 2613 | 84 50 22 | 2607 | 83 11 36 | 2600 | 81 32 41 | 2593 |
| 28 | Antares | W. | 105 59 8 | 2253 | 107 46 16 | 2248 | 109 33 32 | 2243 | 111 20 55 | 2239 |
| | *a* Aquilæ | W. | 60 52 14 | 3413 | 62 14 16 | 3371 | 63 37 6 | 3330 | 65 0 43 | 3293 |
| | *a* Arietis | E. | 43 17 39 | 2368 | 41 33 19 | 2372 | 39 49 4 | 2376 | 38 4 55 | 2382 |
| | Sun | E. | 73 15 56 | 2564 | 71 36 11 | 2559 | 69 56 19 | 2553 | 68 16 20 | 2549 |
| 29 | *a* Aquilæ | W. | 72 8 19 | 3153 | 73 35 24 | 3133 | 75 2 54 | 3114 | 76 30 46 | 3098 |
| | Fomalhaut | W. | 40 41 1 | 2689 | 42 17 55 | 2655 | 43 55 36 | 2624 | 45 33 59 | 2596 |
| | Sun | E. | 59 54 53 | 2528 | 58 14 18 | 2525 | 56 33 40 | 2522 | 54 52 58 | 2521 |
| 30 | *a* Aquilæ | W. | 83 54 17 | 3046 | 85 23 33 | 3041 | 86 52 55 | 3037 | 88 22 22 | 3035 |
| | Fomalhaut | W. | 53 54 0 | 2499 | 55 35 14 | 2486 | 57 16 47 | 2475 | 58 58 36 | 2463 |
| | Jupiter | W. | 18 49 24 | 2250 | 20 36 37 | 2249 | 22 23 51 | 2249 | 24 11 6 | 2249 |
| | Sun | E. | 46 28 58 | 2517 | 44 48 8 | 2517 | 43 7 19 | 2518 | 41 26 31 | 2520 |
| 31 | *a* Aquilæ | W. | 95 49 16 | 3056 | 97 18 19 | 3066 | 98 47 11 | 3078 | 100 15 48 | 3091 |
| | Fomalhaut | W. | 67 30 43 | 2435 | 69 13 28 | 2433 | 70 56 16 | 2431 | 72 39 7 | 2430 |
| | Jupiter | W. | 33 7 6 | 2255 | 34 54 12 | 2258 | 36 41 13 | 2261 | 38 28 10 | 2264 |
| | Sun | E. | 33 3 29 | 2540 | 31 23 12 | 2546 | 29 43 2 | 2553 | 28 3 2 | 2560 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ″ | |
| 22 | Fomalhaut | E. | 54 33 48 | 2880 | 53 1 3 | 2885 | 51 28 25 | 2892 | 49 55 56 | 2900 |
| | α Pegasi | E. | 76 11 57 | 2930 | 74 40 16 | 2927 | 73 8 31 | 2925 | 71 36 44 | 2924 |
| | Jupiter | E. | 84 33 12 | 2631 | 82 54 59 | 2623 | 81 16 35 | 2614 | 79 37 59 | 2606 |
| 23 | Mars | W. | 107 43 38 | 2550 | 109 23 42 | 2542 | 111 3 57 | 2535 | 112 44 22 | 2527 |
| | Spica | W. | 89 24 3 | 2511 | 91 5 1 | 2503 | 92 46 10 | 2495 | 94 27 30 | 2487 |
| | Antares | W. | 43 30 4 | 2509 | 45 11 5 | 2502 | 46 52 16 | 2494 | 48 33 38 | 2485 |
| | Fomalhaut | E. | 42 17 8 | 2980 | 40 46 30 | 3006 | 39 16 25 | 3035 | 37 46 56 | 3015 |
| | α Pegasi | E. | 63 57 50 | 2933 | 62 26 13 | 2939 | 60 54 43 | 2945 | 59 23 21 | 2953 |
| | Jupiter | E. | 71 22 13 | 2565 | 69 42 30 | 2557 | 68 2 36 | 2548 | 66 22 30 | 2540 |
| | α Arietis | E. | 104 52 8 | 2563 | 103 12 23 | 2554 | 101 32 25 | 2546 | 99 52 15 | 2538 |
| | Sun | E. | 131 19 52 | 2839 | 129 46 15 | 2831 | 128 12 27 | 2822 | 126 38 27 | 2813 |
| 24 | Spica | W. | 102 56 55 | 2448 | 104 39 21 | 2441 | 106 21 58 | 2433 | 108 4 45 | 2425 |
| | Antares | W. | 57 3 20 | 2445 | 58 45 50 | 2438 | 60 28 30 | 2430 | 62 11 22 | 2423 |
| | α Pegasi | E. | 51 49 51 | 3028 | 50 20 7 | 3045 | 48 50 50 | 3071 | 47 22 5 | 3102 |
| | Jupiter | E. | 57 59 11 | 2500 | 56 17 58 | 2492 | 54 36 34 | 2485 | 52 54 59 | 2477 |
| | α Arietis | E. | 91 28 35 | 2497 | 89 47 18 | 2489 | 88 5 50 | 2482 | 86 24 11 | 2474 |
| | Sun | E. | 118 45 38 | 2770 | 117 10 30 | 2761 | 115 35 11 | 2753 | 113 59 41 | 2744 |
| 25 | Spica | W. | 116 41 24 | 2389 | 118 25 15 | 2381 | 120 9 17 | 2373 | 121 53 30 | 2366 |
| | Antares | W. | 70 48 22 | 2385 | 72 32 18 | 2378 | 74 16 25 | 2371 | 76 0 42 | 2363 |
| | Jupiter | E. | 44 24 21 | 2438 | 42 41 41 | 2431 | 40 58 50 | 2424 | 39 15 49 | 2416 |
| | α Arietis | E. | 77 53 23 | 2438 | 76 10 43 | 2433 | 74 27 55 | 2426 | 72 44 57 | 2420 |
| | Sun | E. | 105 59 26 | 2704 | 104 22 51 | 2695 | 102 46 5 | 2688 | 101 9 9 | 2680 |
| 26 | Antares | W. | 84 44 47 | 2327 | 86 30 7 | 2321 | 88 15 36 | 2314 | 90 1 15 | 2307 |
| | Jupiter | E. | 30 38 5 | 2380 | 28 54 2 | 2373 | 27 9 49 | 2366 | 25 25 26 | 2359 |
| | α Arietis | E. | 64 8 4 | 2392 | 62 24 18 | 2387 | 60 40 25 | 2383 | 58 56 26 | 2379 |
| | Sun | E. | 93 1 51 | 2641 | 91 23 52 | 2635 | 89 45 44 | 2627 | 88 7 26 | 2621 |
| 27 | Antares | W. | 98 51 54 | 2275 | 100 38 30 | 2270 | 102 25 14 | 2264 | 104 12 7 | 2258 |
| | α Aquilæ | W. | 55 33 33 | 3626 | 56 51 39 | 3565 | 58 10 51 | 3510 | 59 31 4 | 3459 |
| | α Arietis | E. | 50 15 17 | 2366 | 48 30 53 | 2365 | 46 46 28 | 2365 | 45 2 3 | 2366 |
| | Sun | E. | 79 53 37 | 2567 | 78 14 24 | 2561 | 76 35 3 | 2574 | 74 55 33 | 2569 |
| 28 | Antares | W. | 113 8 25 | 2234 | 114 56 2 | 2229 | 116 43 46 | 2225 | 118 31 37 | 2220 |
| | α Aquilæ | W. | 66 25 3 | 3269 | 67 50 2 | 3230 | 69 15 36 | 3202 | 70 41 43 | 3178 |
| | α Arietis | E. | 36 20 55 | 2391 | 34 37 7 | 2402 | 32 53 35 | 2416 | 31 10 23 | 2431 |
| | Sun | E. | 66 36 15 | 2545 | 64 56 4 | 2540 | 63 15 46 | 2535 | 61 35 22 | 2532 |
| 29 | α Aquilæ | W. | 77 58 58 | 3084 | 79 27 27 | 3071 | 80 56 12 | 3061 | 82 25 9 | 3052 |
| | Fomalhaut | W. | 47 12 59 | 2572 | 48 52 33 | 2551 | 50 32 36 | 2531 | 52 13 6 | 2514 |
| | Sun | E. | 53 12 14 | 2519 | 51 31 27 | 2517 | 49 50 38 | 2517 | 48 9 48 | 2517 |
| 30 | α Aquilæ | W. | 89 51 51 | 3037 | 91 21 18 | 3039 | 92 50 43 | 3043 | 94 20 3 | 3048 |
| | Fomalhaut | W. | 60 40 41 | 2453 | 62 23 0 | 2447 | 64 5 28 | 2442 | 65 48 3 | 2438 |
| | Jupiter | W. | 25 58 20 | 2249 | 27 45 34 | 2250 | 29 32 47 | 2251 | 31 19 58 | 2253 |
| | Sun | E. | 39 45 45 | 2523 | 38 5 4 | 2526 | 36 24 26 | 2530 | 34 43 54 | 2535 |
| 31 | α Aquilæ | W. | 101 44 9 | 3106 | 103 12 11 | 3124 | 104 39 52 | 3143 | 106 7 11 | 3167 |
| | Fomalhaut | W. | 74 21 59 | 2429 | 76 4 53 | 2430 | 77 47 45 | 2432 | 79 30 33 | 2436 |
| | Jupiter | W. | 40 15 2 | 2268 | 42 1 48 | 2273 | 43 48 27 | 2278 | 45 34 59 | 2283 |
| | Sun | E. | 26 23 12 | 2569 | 24 43 34 | 2579 | 23 4 11 | 2594 | 21 25 8 | 2615 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from* / *added to Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semi-diameter. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| *Sun.* | 1 | 4 38 9.72 | 10.239 | N.22 7 37.3 | 19.99 | 15 48.16 | 68.43 | 2 26.55 | 0.383 |
| Mon. | 2 | 4 42 15.68 | 10.255 | 22 15 25.6 | 19.02 | 15 48.02 | 68.48 | 2 17.18 | 0.399 |
| Tues. | 3 | 4 46 22.04 | 10.271 | 22 22 50.6 | 18.05 | 15 47.92 | 68.54 | 2 7.41 | 0.414 |
| Wed. | 4 | 4 50 28.73 | 10.285 | 22 29 52.3 | 17.08 | 15 47.80 | 68.59 | 1 57.29 | 0.428 |
| Thur. | 5 | 4 54 35.76 | 10.299 | 22 36 30.3 | 16.08 | 15 47.68 | 68.64 | 1 46.86 | 0.442 |
| Fri. | 6 | 4 58 43.11 | 10.311 | 22 42 44.5 | 15.08 | 15 47.56 | 68.69 | 1 36.10 | 0.455 |
| Sat. | 7 | 5 2 50.76 | 10.322 | 22 48 34.7 | 14.08 | 15 47.45 | 68.73 | 1 25.04 | 0.466 |
| *Sun.* | 8 | 5 6 58.65 | 10.333 | 22 54 0.8 | 13.08 | 15 47.35 | 68.77 | 1 13.74 | 0.476 |
| Mon. | 9 | 5 11 6.81 | 10.343 | 22 59 2.8 | 12.07 | 15 47.25 | 68.81 | 1 2.17 | 0.486 |
| Tues. | 10 | 5 15 15.18 | 10.352 | 23 3 40.5 | 11.06 | 15 47.16 | 68.84 | 0 50.39 | 0.494 |
| Wed. | 11 | 5 19 23.78 | 10.361 | 23 7 53.9 | 10.04 | 15 47.08 | 68.87 | 0 38.37 | 0.502 |
| Thur. | 12 | 5 23 32.55 | 10.368 | 23 11 42.8 | 9.02 | 15 47.00 | 68.90 | 0 26.19 | 0.509 |
| Fri. | 13 | 5 27 41.48 | 10.374 | 23 15 7.3 | 7.99 | 15 46.91 | 68.91 | 0 13.86 | 0.516 |
| Sat. | 14 | 5 31 50.55 | 10.379 | 23 18 7.0 | 6.96 | 15 46.83 | 68.93 | 0 1.39 | 0.522 |
| *Sun.* | 15 | 5 35 59.73 | 10.384 | 23 20 42.2 | 5.94 | 15 46.75 | 68.95 | 0 11.20 | 0.527 |
| Mon. | 16 | 5 40 9.03 | 10.388 | 23 22 52.8 | 4.92 | 15 46.69 | 68.96 | 0 23.90 | 0.532 |
| Tues. | 17 | 5 44 18.39 | 10.390 | 23 24 38.7 | 3.89 | 15 46.62 | 68.97 | 0 36.69 | 0.535 |
| Wed. | 18 | 5 48 27.80 | 10.392 | 23 25 59.8 | 2.85 | 15 46.56 | 68.97 | 0 49.51 | 0.536 |
| Thur. | 19 | 5 52 37.26 | 10.393 | 23 26 56.1 | 1.83 | 15 46.50 | 68.98 | 1 2.37 | 0.537 |
| Fri. | 20 | 5 56 46.74 | 10.394 | 23 27 27.6 | 0.80 | 15 46.44 | 68.98 | 1 15.25 | 0.538 |
| Sat. | 21 | 6 0 56.25 | 10.394 | 23 27 34.5 | 0.23 | 15 46.39 | 68.98 | 1 28.17 | 0.538 |
| *Sun.* | 22 | 6 5 5.72 | 10.392 | 23 27 16.7 | 1.27 | 15 46.34 | 68.97 | 1 41.04 | 0.537 |
| Mon. | 23 | 6 9 15.16 | 10.391 | 23 26 33.9 | 2.29 | 15 46.30 | 68.97 | 1 53.88 | 0.535 |
| Tues. | 24 | 6 13 24.53 | 10.389 | 23 25 26.4 | 3.31 | 15 46.26 | 68.96 | 2 6.66 | 0.531 |
| Wed. | 25 | 6 17 33.83 | 10.384 | 23 23 54.3 | 4.34 | 15 46.22 | 68.94 | 2 19.37 | 0.527 |
| Thur. | 26 | 6 21 43.03 | 10.379 | 23 21 57.4 | 5.37 | 15 46.18 | 68.93 | 2 31.98 | 0.522 |
| Fri. | 27 | 6 25 52.09 | 10.374 | 23 19 36.0 | 6.40 | 15 46.15 | 68.89 | 2 44.44 | 0.516 |
| Sat. | 28 | 6 30 1.00 | 10.366 | 23 16 49.9 | 7.43 | 15 46.13 | 68.86 | 2 56.75 | 0.509 |
| *Sun.* | 29 | 6 34 9.74 | 10.358 | 23 13 39.3 | 8.44 | 15 46.11 | 68.83 | 3 8.90 | 0.501 |
| Mon. | 30 | 6 38 18.27 | 10.350 | 23 10 4.2 | 9.46 | 15 46.09 | 68.80 | 3 20.83 | 0.493 |
| Tues. | 31 | 6 42 26.58 | 10.340 | N.23 6 4.8 | 10.47 | 15 46.08 | 68.76 | 3 32.56 | 0.483 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | Equation of Time, *to be added to* / *subtracted from Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| *Sun.* | 1 | 4 38 10.14 | 10.239 | N.22 7 38.1 | 19.99 | 2 26.54 | 0.383 | 4 40 36.68 |
| Mon. | 2 | 4 42 16.07 | 10.255 | 22 15 26.3 | 19.02 | 2 17.17 | 0.399 | 4 44 33.24 |
| Tues. | 3 | 4 46 22.40 | 10.271 | 22 22 51.2 | 18.05 | 2 7.40 | 0.414 | 4 48 29.80 |
| Wed. | 4 | 4 50 29.06 | 10.285 | 22 29 52.8 | 17.08 | 1 57.30 | 0.428 | 4 52 26.36 |
| Thur. | 5 | 4 54 36.06 | 10.299 | 22 36 30.8 | 16.08 | 1 46.86 | 0.442 | 4 56 22.92 |
| Fri. | 6 | 4 58 43.38 | 10.311 | 22 42 44.9 | 15.08 | 1 36.10 | 0.455 | 5 0 19.48 |
| Sat. | 7 | 5 2 51.00 | 10.322 | 22 48 35.0 | 14.08 | 1 25.04 | 0.466 | 5 4 16.04 |
| *Sun.* | 8 | 5 6 58.86 | 10.333 | 22 54 1.1 | 13.08 | 1 13.74 | 0.476 | 5 8 12.60 |
| Mon. | 9 | 5 11 6.99 | 10.343 | 22 59 3.0 | 12.07 | 1 2.17 | 0.486 | 5 12 9.16 |
| Tues. | 10 | 5 15 15.33 | 10.352 | 23 3 40.7 | 11.06 | 0 50.39 | 0.494 | 5 16 5.72 |
| Wed. | 11 | 5 19 23.89 | 10.361 | 23 7 54.0 | 10.04 | 0 38.38 | 0.502 | 5 20 2.27 |
| Thur. | 12 | 5 23 32.63 | 10.368 | 23 11 42.9 | 9.02 | 0 26.20 | 0.509 | 5 23 58.83 |
| Fri. | 13 | 5 27 41.52 | 10.374 | 23 15 7.3 | 7.99 | 0 13.87 | 0.516 | 5 27 55.39 |
| Sat. | 14 | 5 31 50.55 | 10.379 | 23 18 7.0 | 6.96 | 0 1.40 | 0.522 | 5 31 51.95 |
| *Sun.* | 15 | 5 35 59.70 | 10.384 | 23 20 42.2 | 5.94 | 0 11.19 | 0.527 | 5 35 48.51 |
| Mon. | 16 | 5 40 8.96 | 10.388 | 23 22 52.8 | 4.92 | 0 23.89 | 0.532 | 5 39 45.07 |
| Tues. | 17 | 5 44 18.29 | 10.390 | 23 24 38.7 | 3.89 | 0 36.67 | 0.535 | 5 43 41.62 |
| Wed. | 18 | 5 48 27.66 | 10.392 | 23 25 59.8 | 2.85 | 0 49.49 | 0.536 | 5 47 38.17 |
| Thur. | 19 | 5 52 37.09 | 10.393 | 23 26 56.1 | 1.83 | 1 2.35 | 0.537 | 5 51 34.74 |
| Fri. | 20 | 5 56 46.53 | 10.394 | 23 27 27.6 | 0.80 | 1 15.23 | 0.538 | 5 55 31.30 |
| Sat. | 21 | 6 0 56.00 | 10.394 | 23 27 34.5 | 0.23 | 1 28.14 | 0.538 | 5 59 27.86 |
| *Sun.* | 22 | 6 5 5.43 | 10.392 | 23 27 16.7 | 1.27 | 1 41.01 | 0.537 | 6 3 24.42 |
| Mon. | 23 | 6 9 14.83 | 10.391 | 23 26 34.0 | 2.29 | 1 53.85 | 0.535 | 6 7 20.98 |
| Tues. | 24 | 6 13 24.17 | 10.389 | 23 25 26.6 | 3.31 | 2 6.63 | 0.531 | 6 11 17.54 |
| Wed. | 25 | 6 17 33.43 | 10.384 | 23 23 54.5 | 4.34 | 2 19.34 | 0.527 | 6 15 14.09 |
| Thur. | 26 | 6 21 42.60 | 10.379 | 23 21 57.7 | 5.37 | 2 31.95 | 0.522 | 6 19 10.65 |
| Fri. | 27 | 6 25 51.62 | 10.374 | 23 19 36.3 | 6.40 | 2 44.41 | 0.516 | 6 23 7.21 |
| Sat. | 28 | 6 30 0.49 | 10.366 | 23 16 50.3 | 7.43 | 2 56.72 | 0.509 | 6 27 3.77 |
| *Sun.* | 29 | 6 34 9.20 | 10.358 | 23 13 39.8 | 8.44 | 3 8.87 | 0.501 | 6 31 0.33 |
| Mon. | 30 | 6 38 17.69 | 10.350 | 23 10 4.8 | 9.46 | 3 20.80 | 0.493 | 6 34 56.89 |
| Tues. | 31 | 6 42 25.97 | 10.340 | N.23 6 5.4 | 10.47 | 3 32.52 | 0.483 | 6 38 53.45 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S *True* LONGITUDE. λ | THE SUN'S *True* LONGITUDE. λ' | THE SUN'S Diff. for 1 hour. | THE SUN'S LATITUDE. | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | ° ' " | ' " | " | " | | | h. m. s. |
| 1 | 153 | 71 6 51.4 | 6 37.4 | 143.65 | +0.02 | 0.0062921 | 26.0 | 19 16 13.38 |
| 2 | 154 | 72 4 19.0 | 4 4.9 | 143.61 | 0.14 | .0063527 | 25.0 | 19 12 17.47 |
| 3 | 155 | 73 1 45.7 | 1 31.4 | 143.57 | 0.23 | .0064109 | 23.9 | 19 8 21.56 |
| 4 | 156 | 73 59 11.4 | 58 56.9 | 143.54 | 0.30 | .0064668 | 22.8 | 19 4 25.64 |
| 5 | 157 | 74 56 36.2 | 56 21.5 | 143.50 | 0.34 | .0065203 | 21.8 | 19 0 29.73 |
| 6 | 158 | 75 54 0.0 | 53 45.1 | 143.46 | 0.36 | .0065713 | 20.8 | 18 56 33.81 |
| 7 | 159 | 76 51 22.8 | 50 7.7 | 143.42 | 0.35 | .0066199 | 19.8 | 18 52 37.89 |
| 8 | 160 | 77 48 44.5 | 48 29.2 | 143.38 | 0.30 | .0066664 | 18.8 | 18 48 41.98 |
| 9 | 161 | 78 46 5.2 | 45 49.7 | 143.33 | 0.24 | .0067105 | 17.9 | 18 44 46.07 |
| 10 | 162 | 79 43 25.0 | 43 9.3 | 143.29 | +0.14 | .0067525 | 17.2 | 18 40 50.16 |
| 11 | 163 | 80 40 43.8 | 40 28.0 | 143.26 | 0.00 | .0067925 | 16.5 | 18 36 54.24 |
| 12 | 164 | 81 38 1.7 | 37 45.7 | 143.22 | —0.14 | .0068308 | 15.8 | 18 32 58.34 |
| 13 | 165 | 82 35 18.7 | 35 2.5 | 143.19 | 0.27 | .0068673 | 15.1 | 18 29 2.43 |
| 14 | 166 | 83 32 34.9 | 32 18.5 | 143.15 | 0.40 | .0069022 | 14.3 | 18 25 6.51 |
| 15 | 167 | 84 29 50.2 | 29 33.6 | 143.12 | 0.50 | .0069357 | 13.6 | 18 21 10.59 |
| 16 | 168 | 85 27 4.8 | 26 48.0 | 143.10 | 0.61 | .0069678 | 13.0 | 18 17 14.68 |
| 17 | 169 | 86 24 18.8 | 24 1.8 | 143.08 | 0.69 | .0069983 | 12.4 | 18 13 18.78 |
| 18 | 170 | 87 21 32.2 | 21 15.0 | 143.06 | 0.76 | .0070275 | 11.8 | 18 9 22.88 |
| 19 | 171 | 88 18 45.3 | 18 27.9 | 143.04 | 0.79 | .0070552 | 11.2 | 18 5 26.95 |
| 20 | 172 | 89 15 58.1 | 15 40.5 | 143.04 | 0.80 | .0070812 | 10.6 | 18 1 31.03 |
| 21 | 173 | 90 13 10.7 | 12 52.9 | 143.03 | 0.76 | .0071059 | 9.9 | 17 57 35.12 |
| 22 | 174 | 91 10 23.1 | 10 5.2 | 143.03 | 0.69 | .0071291 | 9.2 | 17 53 39.20 |
| 23 | 175 | 92 7 35.5 | 7 17.4 | 143.02 | 0.61 | .0071505 | 8.5 | 17 49 43.29 |
| 24 | 176 | 93 4 47.8 | 4 29.5 | 143.02 | 0.50 | .0071702 | 7.8 | 17 45 47.38 |
| 25 | 177 | 94 2 0.1 | 1 41.6 | 143.02 | 0.37 | .0071879 | 6.9 | 17 41 51.46 |
| 26 | 178 | 94 59 12.5 | 58 53.8 | 143.02 | 0.22 | .0072036 | 6.0 | 17 37 55.56 |
| 27 | 179 | 95 56 25.0 | 56 6.1 | 143.02 | —0.09 | .0072172 | 5.1 | 17 33 59.65 |
| 28 | 180 | 96 53 37.6 | 53 18.5 | 143.02 | +0.04 | .0072284 | 4.2 | 17 30 3.73 |
| 29 | 181 | 97 50 50.3 | 50 31.0 | 143.02 | 0.17 | .0072372 | 3.2 | 17 26 7.82 |
| 30 | 182 | 98 48 3.1 | 47 43.6 | 143.02 | 0.27 | .0072436 | 2.1 | 17 22 11.90 |
| 31 | 183 | 99 45 16.1 | 44 56.4 | 143.03 | +0.34 | 0.0072475 | 1.0 | 17 18 15.99 |

NOTE.—λ corresponds to the *true* equinox of the date, λ' to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h m. | m. | d. |
| 1 | 16 14.2 | 16 10.9 | 59 28.8 | –0.90 | 59 16.7 | –1.11 | 23 26.6 | 2.34 | 28.9 |
| 2 | 16 6.9 | 16 2.3 | 59 2.1 | 1.31 | 58 45.2 | 1.49 | δ | | 29.9 |
| 3 | 15 57.2 | 15 51.7 | 58 26.4 | 1.63 | 58 6.0 | 1.74 | 0 26.3 | 2.40 | 0.5 |
| 4 | 15 45.8 | 15 39.7 | 57 44.5 | 1.82 | 57 22.3 | 1.86 | 1 26.5 | 2.38 | 1.5 |
| 5 | 15 33.6 | 15 27.5 | 56 59.8 | 1.87 | 56 37.5 | 1.83 | 2 24.9 | 2.27 | 2.5 |
| 6 | 15 21.6 | 15 16.0 | 56 15.8 | 1.77 | 55 55.1 | 1.68 | 3 19.5 | 2.10 | 3.5 |
| 7 | 15 10.7 | 15 5.8 | 55 35.6 | 1.56 | 55 17.9 | 1.43 | 4 9.5 | 1.92 | 4.5 |
| 8 | 15 1.5 | 14 57.7 | 55 1.7 | 1.25 | 54 47.8 | 1.07 | 4 55,3 | 1.76 | 5.5 |
| 9 | 14 54.5 | 14 52.0 | 54 36.1 | 0.87 | 54 26.8 | 0.67 | 5 37.6 | 1.64 | 6.5 |
| 10 | 14 50.1 | 14 49.0 | 54 20.1 | 0.45 | 54 16.0 | –0.23 | 6 17.6 | 1.57 | 7.5 |
| 11 | 14 48.6 | 14 48.8 | 54 14.4 | –0.02 | 54 15.4 | +0.19 | 6 56.6 | 1.55 | 8.5 |
| 12 | 14 49.8 | 14 51.4 | 54 18.9 | +0.39 | 54 24.8 | 0.59 | 7 35.7 | 1.58 | 9.5 |
| 13 | 14 53.7 | 14 56.5 | 54 33.1 | 0.77 | 54 43.4 | 0.93 | 8 16.2 | 1.66 | 10.5 |
| 14 | 14 59.8 | 15 3.6 | 54 55.6 | 1.08 | 55 9.4 | 1.21 | 8 59.2 | 1.79 | 11.5 |
| 15 | 15 7.7 | 15 12.2 | 55 24.7 | 1.32 | 55 41.2 | 1.41 | 9 45.8 | 1.95 | 12.5 |
| 16 | 15 16.9 | 15 21.8 | 55 58.6 | 1.47 | 56 16.6 | 1.51 | 10 36.7 | 2.12 | 13.5 |
| 17 | 15 26.8 | 15 31.9 | 56 34.9 | 1.53 | 56 53.3 | 1.52 | 11 31.8 | 2.28 | 14.5 |
| 18 | 15 36.8 | 15 41.5 | 57 11.4 | 1.48 | 57 28.9 | 1.42 | 12 30.2 | 2.37 | 15.5 |
| 19 | 15 46.1 | 15 50.4 | 57 45.6 | 1.35 | 58 1.3 | 1.26 | 13 29.8 | 2.37 | 16.5 |
| 20 | 15 54.3 | 15 57.9 | 58 15.8 | 1.15 | 58 29.0 | 1.03 | 14 28.2 | 2.28 | 17.5 |
| 21 | 16 1.1 | 16 3.9 | 58 40.7 | 0.91 | 58 50.9 | 0.79 | 15 23.8 | 2.16 | 18.5 |
| 22 | 16 6.3 | 16 8.2 | 58 59.6 | 0.66 | 59 6.7 | 0.53 | 16 16.1 | 2.04 | 19.5 |
| 23 | 16 9.7 | 16 10.8 | 59 12.3 | 0.41 | 59 16.5 | 0.30 | 17 5.6 | 1.94 | 20.5 |
| 24 | 16 11.6 | 16 12.0 | 59 19.4 | +0.19 | 59 21.0 | +0.08 | 17 53.6 | 1.90 | 21.5 |
| 25 | 16 12.1 | 16 11.9 | 59 21.3 | –0.03 | 59 20.4 | –0.13 | 18 41.3 | 1.92 | 22.5 |
| 26 | 16 11.3 | 16 10.3 | 59 18.2 | 0.24 | 59 14.6 | 0.35 | 19 30.2 | 2.00 | 23.5 |
| 27 | 16 9.0 | 16 7.3 | 59 9.8 | 0.46 | 59 3.6 | 0.57 | 20 21.5 | 2.11 | 24.5 |
| 28 | 16 5.2 | 16 2.7 | 58 55.9 | 0.70 | 58 46.7 | 0.83 | 21 15.9 | 2.24 | 25.5 |
| 29 | 15 59.8 | 15 56.5 | 58 36.0 | 0.95 | 58 23.8 | 1.07 | 22 13.5 | 2.36 | 26.5 |
| 30 | 15 52.8 | 15 48.7 | 58 10.2 | 1.19 | 57 55.3 | 1.28 | 23 13.8 | 2.45 | 27.5 |
| 31 | 15 44.4 | 15 39.8 | 57 39.4 | –1.36 | 57 22.5 | –1.42 | δ | | 28.5 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SUNDAY 1. | | | | | TUESDAY 3. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 13 28.39 | 2.3983 | N.20 28 5.6 | 12.194 | 0 | 5 13 42.59 | 2.5770 | N.27 18 33.6 | 4.479 |
| 1 | 3 15 52.45 | 2.4036 | 20 40 13.4 | 12.064 | 1 | 5 16 17.24 | 2.5780 | 27 22 56.9 | 4.297 |
| 2 | 3 18 16.82 | 2.4088 | 20 52 13.3 | 11.932 | 2 | 5 18 51.95 | 2.5788 | 27 27 9.3 | 4.115 |
| 3 | 3 20 41.51 | 2.4141 | 21 4 5.2 | 11.797 | 3 | 5 21 26.70 | 2.5795 | 27 31 10.7 | 3.933 |
| 4 | 3 23 6.51 | 2.4193 | 21 15 49.0 | 11.662 | 4 | 5 24 1.49 | 2.5800 | 27 35 1.2 | 3.750 |
| 5 | 3 25 31.82 | 2.4245 | 21 27 24.7 | 11.527 | 5 | 5 26 36.30 | 2.5803 | 27 38 40.7 | 3.567 |
| 6 | 3 27 57.45 | 2.4297 | 21 38 52.3 | 11.390 | 6 | 5 29 11.12 | 2.5804 | 27 42 9.2 | 3.384 |
| 7 | 3 30 23.38 | 2.4348 | 21 50 11.5 | 11.249 | 7 | 5 31 45.95 | 2.5805 | 27 45 26.7 | 3.201 |
| 8 | 3 32 49.62 | 2.4398 | 22 1 22.2 | 11.108 | 8 | 5 34 20.78 | 2.5804 | 27 48 33.3 | 3.018 |
| 9 | 3 35 16.16 | 2.4449 | 22 12 24.5 | 10.967 | 9 | 5 36 55.60 | 2.5802 | 27 51 28.9 | 2.835 |
| 10 | 3 37 43.01 | 2.4499 | 22 23 18.2 | 10.823 | 10 | 5 39 30.40 | 2.5797 | 27 54 13.5 | 2.652 |
| 11 | 3 40 10.15 | 2.4548 | 22 34 3.2 | 10.677 | 11 | 5 42 5.16 | 2.5791 | 27 56 47.1 | 2.468 |
| 12 | 3 42 37.59 | 2.4598 | 22 44 39.5 | 10.531 | 12 | 5 44 39.89 | 2.5784 | 27 59 9.7 | 2.285 |
| 13 | 3 45 5.32 | 2.4646 | 22 55 6.9 | 10.382 | 13 | 5 47 14.57 | 2.5774 | 28 1 21.3 | 2.102 |
| 14 | 3 47 33.34 | 2.4693 | 23 5 25.4 | 10.232 | 14 | 5 49 49.18 | 2.5763 | 28 3 22.0 | 1.920 |
| 15 | 3 50 1.64 | 2.4741 | 23 15 34.8 | 10.082 | 15 | 5 52 23.73 | 2.5751 | 28 5 11.7 | 1.737 |
| 16 | 3 52 30.23 | 2.4788 | 23 25 35.1 | 9.928 | 16 | 5 54 58.20 | 2.5737 | 28 6 50.4 | 1.554 |
| 17 | 3 54 59.10 | 2.4835 | 23 35 26.2 | 9.774 | 17 | 5 57 32.57 | 2.5721 | 28 8 18.2 | 1.373 |
| 18 | 3 57 28.25 | 2.4881 | 23 45 8.0 | 9.619 | 18 | 6 0 6.85 | 2.5704 | 28 9 35.2 | 1.192 |
| 19 | 3 59 57.67 | 2.4925 | 23 54 40.5 | 9.462 | 19 | 6 2 41.02 | 2.5686 | 28 10 41.2 | 1.010 |
| 20 | 4 2 27.35 | 2.4969 | 24 4 3.5 | 9.304 | 20 | 6 5 15.08 | 2.5666 | 28 11 36.4 | 0.829 |
| 21 | 4 4 57.29 | 2.5012 | 24 13 17.0 | 9.145 | 21 | 6 7 49.01 | 2.5643 | 28 12 20.7 | 0.648 |
| 22 | 4 7 27.49 | 2.5054 | 24 22 20.9 | 8.984 | 22 | 6 10 22.80 | 2.5619 | 28 12 54.2 | 0.468 |
| 23 | 4 9 57.94 | 2.5096 | N.24 31 15.1 | 8.823 | 23 | 6 12 56.44 | 2.5595 | N.28 13 16.9 | 0.288 |
| | MONDAY 2. | | | | | WEDNESDAY 4. | | | |
| 0 | 4 12 28.63 | 2.5135 | N.24 39 59.7 | 8.661 | 0 | 6 15 29.93 | 2.5568 | N.28 13 28.8 | 0.109 |
| 1 | 4 14 59.56 | 2.5175 | 24 48 34.5 | 8.497 | 1 | 6 18 3.26 | 2.5541 | 28 13 30.0 | 0.069 |
| 2 | 4 17 30.73 | 2.5215 | 24 56 59.3 | 8.331 | 2 | 6 20 36.42 | 2.5511 | 28 13 20.5 | 0.246 |
| 3 | 4 20 2.14 | 2.5253 | 25 5 14.2 | 8.165 | 3 | 6 23 9.39 | 2.5479 | 28 13 0.4 | 0.423 |
| 4 | 4 22 33.77 | 2.5289 | 25 13 19.1 | 7.998 | 4 | 6 25 42.17 | 2.5447 | 28 12 29.7 | 0.600 |
| 5 | 4 25 5.61 | 2.5325 | 25 21 13.9 | 7.829 | 5 | 6 28 14.75 | 2.5413 | 28 11 48.4 | 0.777 |
| 6 | 4 27 37.67 | 2.5360 | 25 28 58.6 | 7.660 | 6 | 6 30 47.13 | 2.5378 | 28 10 56.5 | 0.953 |
| 7 | 4 30 9.93 | 2.5393 | 25 36 33.2 | 7.490 | 7 | 6 33 19.29 | 2.5342 | 28 9 54.2 | 1.126 |
| 8 | 4 32 42.39 | 2.5426 | 25 43 57.5 | 7.318 | 8 | 6 35 51.23 | 2.5303 | 28 8 41.5 | 1.299 |
| 9 | 4 35 15.04 | 2.5457 | 25 51 11.4 | 7.146 | 9 | 6 38 22.93 | 2.5263 | 28 7 18.3 | 1.472 |
| 10 | 4 37 47.87 | 2.5487 | 25 58 15.0 | 6.973 | 10 | 6 40 54.39 | 2.5222 | 28 5 44.8 | 1.644 |
| 11 | 4 40 20.88 | 2.5516 | 26 5 8.2 | 6.800 | 11 | 6 43 25.59 | 2.5179 | 28 4 1.0 | 1.816 |
| 12 | 4 42 54.06 | 2.5543 | 26 11 51.0 | 6.626 | 12 | 6 45 56.54 | 2.5136 | 28 2 7.0 | 1.985 |
| 13 | 4 45 27.40 | 2.5569 | 26 18 23.3 | 6.450 | 13 | 6 48 27.23 | 2.5092 | 28 0 2.8 | 2.154 |
| 14 | 4 48 0.89 | 2.5594 | 26 24 45.0 | 6.273 | 14 | 6 50 57.64 | 2.5045 | 27 57 48.5 | 2.322 |
| 15 | 4 50 34.53 | 2.5618 | 26 30 56.1 | 6.096 | 15 | 6 53 27.77 | 2.4998 | 27 55 24.1 | 2.490 |
| 16 | 4 53 8.31 | 2.5642 | 26 36 56.6 | 5.919 | 16 | 6 55 57.61 | 2.4949 | 27 52 49.7 | 2.656 |
| 17 | 4 55 42.23 | 2.5663 | 26 42 46.4 | 5.742 | 17 | 6 58 27.16 | 2.4900 | 27 50 5.4 | 2.820 |
| 18 | 4 58 16.27 | 2.5682 | 26 48 25.6 | 5.563 | 18 | 7 0 56.41 | 2.4850 | 27 47 11.3 | 2.984 |
| 19 | 5 0 50.42 | 2.5700 | 26 53 54.0 | 5.383 | 19 | 7 3 25.36 | 2.4798 | 27 44 7.3 | 3.147 |
| 20 | 5 3 24.67 | 2.5717 | 26 59 11.6 | 5.203 | 20 | 7 5 53.99 | 2.4744 | 27 40 53.6 | 3.309 |
| 21 | 5 5 59.03 | 2.5734 | 27 4 18.4 | 5.023 | 21 | 7 8 22.29 | 2.4689 | 27 37 30.2 | 3.470 |
| 22 | 5 8 33.48 | 2.5748 | 27 9 14.3 | 4.842 | 22 | 7 10 50.26 | 2.4633 | 27 33 57.2 | 3.630 |
| 23 | 5 11 8.00 | 2.5759 | 27 13 59.4 | 4.661 | 23 | 7 13 17.89 | 2.4578 | 27 30 14.6 | 3.788 |
| 24 | 5 13 42.59 | 2.5770 | N.27 18 33.6 | 4.479 | 24 | 7 15 45.19 | 2.4522 | N.27 26 22.6 | 3.945 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 15 45.19 | 2.4522 | N.27 26 22.6 | 3.945 |
| 1 | 7 18 12.15 | 2.4463 | 27 22 21.2 | 4.101 |
| 2 | 7 20 38.75 | 2.4403 | 27 18 10.5 | 4.256 |
| 3 | 7 23 4.99 | 2.4342 | 27 13 50.5 | 4.410 |
| 4 | 7 25 30.86 | 2.4281 | 27 9 21.3 | 4.562 |
| 5 | 7 27 56.36 | 2.4220 | 27 4 43.0 | 4.713 |
| 6 | 7 30 21.50 | 2.4159 | 26 59 55.7 | 4.863 |
| 7 | 7 32 46.27 | 2.4096 | 26 54 59.4 | 5.012 |
| 8 | 7 35 10.65 | 2.4030 | 26 49 54.3 | 5.158 |
| 9 | 7 37 34.63 | 2.3964 | 26 44 40.4 | 5.304 |
| 10 | 7 39 58.22 | 2.3899 | 26 39 17.8 | 5.449 |
| 11 | 7 42 21.42 | 2.3833 | 26 33 46.5 | 5.592 |
| 12 | 7 44 44.22 | 2.3766 | 26 28 6.7 | 5.734 |
| 13 | 7 47 6.61 | 2.3699 | 26 22 18.4 | 5.874 |
| 14 | 7 49 28.60 | 2.3631 | 26 16 21.8 | 6.013 |
| 15 | 7 51 50.18 | 2.3564 | 26 10 16.8 | 6.151 |
| 16 | 7 54 11.36 | 2.3496 | 26 4 3.6 | 6.287 |
| 17 | 7 56 32.13 | 2.3427 | 25 57 42.3 | 6.422 |
| 18 | 7 58 52.48 | 2.3357 | 25 51 12.9 | 6.556 |
| 19 | 8 1 12.41 | 2.3286 | 25 44 35.6 | 6.688 |
| 20 | 8 3 31.91 | 2.3214 | 25 37 50.4 | 6.819 |
| 21 | 8 5 50.98 | 2.3143 | 25 30 57.3 | 6.949 |
| 22 | 8 8 9.63 | 2.3072 | 25 28 56.5 | 7.077 |
| 23 | 8 10 27.85 | 2.3001 | N.25 16 48.1 | 7.202 |

### FRIDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 12 45.64 | 2.2930 | N.25 9 32.2 | 7.327 |
| 1 | 8 15 3.01 | 2.2858 | 25 2 8.8 | 7.451 |
| 2 | 8 17 19.94 | 2.2785 | 24 54 38.1 | 7.573 |
| 3 | 8 19 36.43 | 2.2712 | 24 47 0.0 | 7.695 |
| 4 | 8 21 52.48 | 2.2640 | 24 39 14.7 | 7.814 |
| 5 | 8 24 8.10 | 2.2568 | 24 31 22.3 | 7.932 |
| 6 | 8 26 23.29 | 2.2496 | 24 23 22.9 | 8.047 |
| 7 | 8 28 38.05 | 2.2423 | 24 15 16.6 | 8.162 |
| 8 | 8 30 52.37 | 2.2349 | 24 7 3.4 | 8.277 |
| 9 | 8 33 6.24 | 2.2275 | 23 58 43.3 | 8.391 |
| 10 | 8 35 19.67 | 2.2208 | 23 50 16.5 | 8.501 |
| 11 | 8 37 32.67 | 2.2133 | 23 41 43.2 | 8.610 |
| 12 | 8 39 45.25 | 2.2060 | 23 33 3.3 | 8.718 |
| 13 | 8 41 57.39 | 2.1987 | 23 24 17.0 | 8.826 |
| 14 | 8 44 9.09 | 2.1914 | 23 15 24.3 | 8.931 |
| 15 | 8 46 20.36 | 2.1842 | 23 6 25.3 | 9.035 |
| 16 | 8 48 31.19 | 2.1769 | 22 57 20.1 | 9.137 |
| 17 | 8 50 41.59 | 2.1697 | 22 48 8.8 | 9.239 |
| 18 | 8 52 51.55 | 2.1625 | 22 38 51.4 | 9.339 |
| 19 | 8 55 1.09 | 2.1554 | 22 29 28.1 | 9.437 |
| 20 | 8 57 10.20 | 2.1483 | 22 19 58.9 | 9.535 |
| 21 | 8 59 18.88 | 2.1411 | 22 10 23.9 | 9.631 |
| 22 | 9 1 27.13 | 2.1340 | 22 0 43.2 | 9.726 |
| 23 | 9 3 34.96 | 2.1270 | 21 50 56.9 | 9.818 |
| 24 | 9 5 42.37 | 2.1200 | N.21 41 5.0 | 9.910 |

### SATURDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 5 42.37 | 2.1200 | N.21 41 5.0 | 9.910 |
| 1 | 9 7 49.36 | 2.1130 | 21 31 7.7 | 10.000 |
| 2 | 9 9 55.93 | 2.1061 | 21 21 5.0 | 10.089 |
| 3 | 9 12 2.09 | 2.0992 | 21 10 57.0 | 10.177 |
| 4 | 9 14 7.83 | 2.0923 | 21 0 43.8 | 10.264 |
| 5 | 9 16 13.16 | 2.0855 | 20 50 25.4 | 10.350 |
| 6 | 9 18 18.09 | 2.0788 | 20 40 1.8 | 10.435 |
| 7 | 9 20 22.61 | 2.0720 | 20 29 33.2 | 10.517 |
| 8 | 9 22 26.73 | 2.0653 | 20 18 59.7 | 10.598 |
| 9 | 9 24 30.45 | 2.0586 | 20 8 21.4 | 10.678 |
| 10 | 9 26 33.76 | 2.0519 | 19 57 38.3 | 10.757 |
| 11 | 9 28 36.68 | 2.0454 | 19 46 50.5 | 10.836 |
| 12 | 9 30 39.21 | 2.0389 | 19 35 58.0 | 10.913 |
| 13 | 9 32 41.35 | 2.0325 | 19 25 0.9 | 10.988 |
| 14 | 9 34 43.11 | 2.0261 | 19 13 59.4 | 11.062 |
| 15 | 9 36 44.48 | 2.0197 | 19 2 53.4 | 11.136 |
| 16 | 9 38 45.47 | 2.0134 | 18 51 43.1 | 11.208 |
| 17 | 9 40 46.09 | 2.0072 | 18 40 28.5 | 11.279 |
| 18 | 9 42 46.33 | 2.0010 | 18 29 9.6 | 11.349 |
| 19 | 9 44 46.21 | 1.9949 | 18 17 46.6 | 11.417 |
| 20 | 9 46 45.72 | 1.9888 | 18 6 19.5 | 11.485 |
| 21 | 9 48 44.87 | 1.9828 | 17 54 48.4 | 11.551 |
| 22 | 9 50 43.66 | 1.9768 | 17 43 13.4 | 11.616 |
| 23 | 9 52 42.09 | 1.9709 | N.17 31 34.5 | 11.681 |

### SUNDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 54 40.17 | 1.9651 | N.17 19 51.7 | 11.744 |
| 1 | 9 56 37.90 | 1.9593 | 17 8 5.2 | 11.806 |
| 2 | 9 58 35.29 | 1.9537 | 16 56 15.0 | 11.867 |
| 3 | 10 0 32.35 | 1.9482 | 16 44 21.2 | 11.927 |
| 4 | 10 2 29.07 | 1.9426 | 16 32 23.8 | 11.986 |
| 5 | 10 4 25.46 | 1.9371 | 16 20 22.9 | 12.043 |
| 6 | 10 6 21.52 | 1.9317 | 16 8 18.6 | 12.100 |
| 7 | 10 8 17.26 | 1.9263 | 15 56 10.9 | 12.156 |
| 8 | 10 10 12.68 | 1.9210 | 15 43 59.9 | 12.210 |
| 9 | 10 12 7.79 | 1.9159 | 15 31 45.7 | 12.263 |
| 10 | 10 14 2.59 | 1.9108 | 15 19 28.3 | 12.316 |
| 11 | 10 15 57.08 | 1.9057 | 15 7 7.7 | 12.368 |
| 12 | 10 17 51.26 | 1.9006 | 14 54 44.1 | 12.418 |
| 13 | 10 19 45.15 | 1.8957 | 14 42 17.5 | 12.468 |
| 14 | 10 21 38.75 | 1.8909 | 14 29 47.9 | 12.518 |
| 15 | 10 23 32.06 | 1.8861 | 14 17 15.3 | 12.566 |
| 16 | 10 25 25.08 | 1.8813 | 14 4 39.9 | 12.613 |
| 17 | 10 27 17.82 | 1.8767 | 13 52 1.7 | 12.660 |
| 18 | 10 29 10.29 | 1.8722 | 13 39 20.7 | 12.706 |
| 19 | 10 31 2.48 | 1.8677 | 13 26 37.0 | 12.750 |
| 20 | 10 32 54.41 | 1.8632 | 13 13 50.7 | 12.793 |
| 21 | 10 34 46.07 | 1.8588 | 13 1 1.9 | 12.835 |
| 22 | 10 36 37.47 | 1.8546 | 12 48 10.5 | 12.877 |
| 23 | 10 38 28.62 | 1.8504 | 12 35 16.6 | 12.918 |
| 24 | 10 40 19.52 | 1.8463 | N.12 22 20.3 | 12.958 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 9. | | | | | WEDNESDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 40 19.52 | 1.8463 | N.12 22 20.3 | 12.958 | 0 | 12 5 40.83 | 1.7403 | N. 1 28 51.3 | 13.999 |
| 1 | 10 42 10.18 | 1.8423 | 12 9 21.6 | 12.997 | 1 | 12 7 25.24 | 1.7401 | 1 14 51.2 | 14.004 |
| 2 | 10 44 0.60 | 1.8384 | 11 56 20.6 | 13.035 | 2 | 12 9 9.64 | 1.7399 | 1 0 50.8 | 14.009 |
| 3 | 10 45 50.78 | 1.8344 | 11 43 17.4 | 13.073 | 3 | 12 10 54.03 | 1.7398 | 0 46 50.1 | 14.013 |
| 4 | 10 47 40.73 | 1.8306 | 11 30 11.9 | 13.110 | 4 | 12 12 38.41 | 1.7397 | 0 32 49.2 | 14.015 |
| 5 | 10 49 30.45 | 1.8268 | 11 17 4.2 | 13.146 | 5 | 12 14 22.79 | 1.7398 | 0 18 48.2 | 14.018 |
| 6 | 10 51 19.95 | 1.8232 | 11 3 54.4 | 13.181 | 6 | 12 16 7.18 | 1.7399 | N. 0 4 47.0 | 14.020 |
| 7 | 10 53 9.23 | 1.8196 | 10 50 42.5 | 13.215 | 7 | 12 17 51.58 | 1.7401 | S. 0 9 14.2 | 14.021 |
| 8 | 10 54 58.30 | 1.8161 | 10 37 28.6 | 13.248 | 8 | 12 19 35.99 | 1.7403 | 0 23 15.5 | 14.022 |
| 9 | 10 56 47.16 | 1.8126 | 10 24 12.7 | 13.281 | 9 | 12 21 20.42 | 1.7407 | 0 37 16.9 | 14.023 |
| 10 | 10 58 35.81 | 1.8093 | 10 10 54.9 | 13.313 | 10 | 12 23 4.87 | 1.7411 | 0 51 18.3 | 14.022 |
| 11 | 11 0 24.27 | 1.8061 | 9 57 35.2 | 13.344 | 11 | 12 24 49.35 | 1.7417 | 1 5 19.6 | 14.020 |
| 12 | 11 2 12.54 | 1.8029 | 9 44 13.6 | 13.375 | 12 | 12 26 33.87 | 1.7423 | 1 19 20.7 | 14.017 |
| 13 | 11 4 0.62 | 1.7997 | 9 30 50.2 | 13.404 | 13 | 12 28 18.42 | 1.7429 | 1 33 21.7 | 14.015 |
| 14 | 11 5 48.51 | 1.7967 | 9 17 25.1 | 13.433 | 14 | 12 30 3.02 | 1.7436 | 1 47 22.5 | 14.012 |
| 15 | 11 7 36.22 | 1.7937 | 9 3 58.3 | 13.461 | 15 | 12 31 47.66 | 1.7444 | 2 1 23.2 | 14.009 |
| 16 | 11 9 23.76 | 1.7909 | 8 50 29.8 | 13.488 | 16 | 12 33 32.35 | 1.7453 | 2 15 23.6 | 14.004 |
| 17 | 11 11 11.13 | 1.7881 | 8 36 59.7 | 13.515 | 17 | 12 35 17.10 | 1.7464 | 2 29 23.7 | 13.999 |
| 18 | 11 12 58.33 | 1.7853 | 8 23 28.0 | 13.541 | 18 | 12 37 1.92 | 1.7475 | 2 43 23.5 | 13.993 |
| 19 | 11 14 45.37 | 1.7827 | 8 9 54.8 | 13.566 | 19 | 12 38 46.80 | 1.7486 | 2 57 22.9 | 13.987 |
| 20 | 11 16 32.26 | 1.7802 | 7 56 20.1 | 13.591 | 20 | 12 40 31.75 | 1.7499 | 3 11 21.9 | 13.979 |
| 21 | 11 18 18.99 | 1.7777 | 7 42 43.9 | 13.615 | 21 | 12 42 16.78 | 1.7512 | 3 25 20.4 | 13.971 |
| 22 | 11 20 5.58 | 1.7753 | 7 29 6.3 | 13.638 | 22 | 12 44 1.89 | 1.7525 | 3 39 18.4 | 13.963 |
| 23 | 11 21 52.03 | 1.7730 | N. 7 15 27.4 | 13.660 | 23 | 12 45 47.08 | 1.7538 | S. 3 53 15.9 | 13.954 |
| | TUESDAY 10. | | | | | THURSDAY 12. | | | |
| 0 | 11 23 38.34 | 1.7707 | N. 7 1 47.1 | 13.682 | 0 | 12 47 32.35 | 1.7553 | S. 4 7 12.9 | 13.945 |
| 1 | 11 25 24.52 | 1.7686 | 6 48 5.5 | 13.703 | 1 | 12 49 17.72 | 1.7570 | 4 21 9.3 | 13.934 |
| 2 | 11 27 10.57 | 1.7665 | 6 34 22.7 | 13.723 | 2 | 12 51 3.19 | 1.7588 | 4 35 5.0 | 13.922 |
| 3 | 11 28 56.50 | 1.7645 | 6 20 38.8 | 13.742 | 3 | 12 52 48.77 | 1.7606 | 4 48 59.9 | 13.910 |
| 4 | 11 30 42.31 | 1.7625 | 6 6 53.7 | 13.761 | 4 | 12 54 34.46 | 1.7624 | 5 2 54.1 | 13.897 |
| 5 | 11 32 28.00 | 1.7606 | 5 53 7.5 | 13.779 | 5 | 12 56 20.26 | 1.7643 | 5 16 47.5 | 13.883 |
| 6 | 11 34 13.58 | 1.7588 | 5 39 20.3 | 13.796 | 6 | 12 58 6.17 | 1.7663 | 5 30 40.1 | 13.869 |
| 7 | 11 35 59.06 | 1.7571 | 5 25 32.0 | 13.813 | 7 | 12 59 52.21 | 1.7684 | 5 44 31.8 | 13.854 |
| 8 | 11 37 44.44 | 1.7555 | 5 11 42.7 | 13.829 | 8 | 13 1 38.38 | 1.7705 | 5 58 22.6 | 13.839 |
| 9 | 11 39 29.72 | 1.7539 | 4 57 52.5 | 13.844 | 9 | 13 3 24.67 | 1.7727 | 6 12 12.5 | 13.823 |
| 10 | 11 41 14.91 | 1.7525 | 4 44 1.4 | 13.859 | 10 | 13 5 11.10 | 1.7751 | 6 26 1.4 | 13.806 |
| 11 | 11 43 0.02 | 1.7511 | 4 30 9.4 | 13.874 | 11 | 13 6 57.68 | 1.7775 | 6 39 49.2 | 13.788 |
| 12 | 11 44 45.05 | 1.7498 | 4 16 16.5 | 13.888 | 12 | 13 8 44.40 | 1.7799 | 6 53 35.9 | 13.769 |
| 13 | 11 46 30.00 | 1.7486 | 4 2 22.8 | 13.901 | 13 | 13 10 31.27 | 1.7825 | 7 7 21.5 | 13.750 |
| 14 | 11 48 14.88 | 1.7475 | 3 48 28.4 | 13.913 | 14 | 13 12 18.30 | 1.7852 | 7 21 5.9 | 13.730 |
| 15 | 11 49 59.70 | 1.7464 | 3 34 33.3 | 13.924 | 15 | 13 14 5.49 | 1.7878 | 7 34 49.1 | 13.709 |
| 16 | 11 51 44.45 | 1.7454 | 3 20 37.5 | 13.935 | 16 | 13 15 52.84 | 1.7905 | 7 48 31.0 | 13.688 |
| 17 | 11 53 29.15 | 1.7445 | 3 6 41.1 | 13.946 | 17 | 13 17 40.35 | 1.7933 | 8 2 11.6 | 13.666 |
| 18 | 11 55 13.79 | 1.7437 | 2 52 44.0 | 13.955 | 18 | 13 19 28.04 | 1.7963 | 8 15 50.9 | 13.643 |
| 19 | 11 56 58.39 | 1.7430 | 2 38 46.4 | 13.964 | 19 | 13 21 15.91 | 1.7993 | 8 29 28.8 | 13.619 |
| 20 | 11 58 42.95 | 1.7423 | 2 24 48.3 | 13.973 | 20 | 13 23 3.96 | 1.8024 | 8 43 5.2 | 13.594 |
| 21 | 12 0 27.46 | 1.7417 | 2 10 49.6 | 13.981 | 21 | 13 24 52.20 | 1.8056 | 8 56 40.1 | 13.568 |
| 22 | 12 2 11.94 | 1.7412 | 1 56 50.5 | 13.987 | 22 | 13 26 40.63 | 1.8088 | 9 10 13.4 | 13.542 |
| 23 | 12 3 56.40 | 1.7407 | 1 42 51.1 | 13.993 | 23 | 13 28 29.26 | 1.8121 | 9 23 45.1 | 13.515 |
| 24 | 12 5 40.83 | 1.7403 | N. 1 28 51.3 | 13.999 | 24 | 13 30 18.09 | 1.8155 | S. 9 37 15.2 | 13.487 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 30 18.09 | 1.8156 | S. 9 37 15.2 | 13.487 |
| 1 | 13 32 7.12 | 1.8190 | 9 50 43.6 | 13.459 |
| 2 | 13 33 56.37 | 1.8226 | 10 4 10.3 | 13.431 |
| 3 | 13 35 45.83 | 1.8262 | 10 17 35.3 | 13.401 |
| 4 | 13 37 35.51 | 1.8299 | 10 30 58.4 | 13.369 |
| 5 | 13 39 25.42 | 1.8337 | 10 44 19.5 | 13.336 |
| 6 | 13 41 15.55 | 1.8375 | 10 57 38.7 | 13.303 |
| 7 | 13 43 5.91 | 1.8413 | 11 10 55.9 | 13.269 |
| 8 | 13 44 56.51 | 1.8454 | 11 24 11.0 | 13.234 |
| 9 | 13 46 47.36 | 1.8496 | 11 37 24.0 | 13.199 |
| 10 | 13 48 38.45 | 1.8536 | 11 50 34.9 | 13.162 |
| 11 | 13 50 29.79 | 1.8578 | 12 3 43.5 | 13.125 |
| 12 | 13 52 21.39 | 1.8621 | 12 16 49.9 | 13.087 |
| 13 | 13 54 13.24 | 1.8664 | 12 29 54.0 | 13.048 |
| 14 | 13 56 5.36 | 1.8709 | 12 42 55.7 | 13.007 |
| 15 | 13 57 57.75 | 1.8754 | 12 55 54.9 | 12.966 |
| 16 | 13 59 50.41 | 1.8800 | 13 8 51.6 | 12.924 |
| 17 | 14 1 43.35 | 1.8846 | 13 21 45.8 | 12.882 |
| 18 | 14 3 36.56 | 1.8893 | 13 34 37.4 | 12.837 |
| 19 | 14 5 30.06 | 1.8941 | 13 47 26.3 | 12.792 |
| 20 | 14 7 23.85 | 1.8989 | 14 0 12.5 | 12.747 |
| 21 | 14 9 17.93 | 1.9038 | 14 12 55.9 | 12.700 |
| 22 | 14 11 12.31 | 1.9088 | 14 25 36.5 | 12.652 |
| 23 | 14 13 6.99 | 1.9139 | S.14 38 14.1 | 12.603 |

### SATURDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 15 1.98 | 1.9191 | S.14 50 48.8 | 12.553 |
| 1 | 14 16 57.28 | 1.9243 | 15 3 20.5 | 12.502 |
| 2 | 14 18 52.89 | 1.9295 | 15 15 49.0 | 12.449 |
| 3 | 14 20 48.82 | 1.9348 | 15 28 14.4 | 12.396 |
| 4 | 14 22 45.07 | 1.9402 | 15 40 36.5 | 12.342 |
| 5 | 14 24 41.65 | 1.9457 | 15 52 55.4 | 12.287 |
| 6 | 14 26 38.55 | 1.9512 | 16 5 10.9 | 12.230 |
| 7 | 14 28 35.79 | 1.9568 | 16 17 23.0 | 12.172 |
| 8 | 14 30 33.37 | 1.9624 | 16 29 31.6 | 12.113 |
| 9 | 14 32 31.28 | 1.9681 | 16 41 36.6 | 12.053 |
| 10 | 14 34 29.54 | 1.9739 | 16 53 38.0 | 11.993 |
| 11 | 14 36 28.15 | 1.9797 | 17 5 35.8 | 11.932 |
| 12 | 14 38 27.10 | 1.9855 | 17 17 29.8 | 11.868 |
| 13 | 14 40 26.40 | 1.9914 | 17 29 20.0 | 11.804 |
| 14 | 14 42 26.07 | 1.9975 | 17 41 6.3 | 11.738 |
| 15 | 14 44 26.10 | 2.0036 | 17 52 48.6 | 11.672 |
| 16 | 14 46 26.50 | 2.0097 | 18 4 26.9 | 11.603 |
| 17 | 14 48 27.27 | 2.0158 | 18 16 1.0 | 11.534 |
| 18 | 14 50 28.40 | 2.0219 | 18 27 31.0 | 11.464 |
| 19 | 14 52 29.90 | 2.0282 | 18 38 56.7 | 11.392 |
| 20 | 14 54 31.78 | 2.0346 | 18 50 18.1 | 11.320 |
| 21 | 14 56 34.05 | 2.0410 | 19 1 35.1 | 11.247 |
| 22 | 14 58 36.70 | 2.0474 | 19 12 47.7 | 11.172 |
| 23 | 15 0 39.74 | 2.0538 | 19 23 55.7 | 11.094 |
| 24 | 15 2 43.16 | 2.0603 | S.19 34 59.0 | 11.016 |

### SUNDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 2 43.16 | 2.0603 | S.19 34 59.0 | 11.016 |
| 1 | 15 4 46.97 | 2.0668 | 19 45 57.6 | 10.937 |
| 2 | 15 6 51.18 | 2.0734 | 19 56 51.5 | 10.857 |
| 3 | 15 8 55.78 | 2.0800 | 20 7 40.5 | 10.776 |
| 4 | 15 11 0.78 | 2.0867 | 20 18 24.6 | 10.693 |
| 5 | 15 13 6.18 | 2.0934 | 20 29 3.7 | 10.609 |
| 6 | 15 15 11.99 | 2.1002 | 20 39 37.7 | 10.523 |
| 7 | 15 17 18.20 | 2.1069 | 20 50 6.5 | 10.436 |
| 8 | 15 19 24.82 | 2.1136 | 21 0 30.1 | 10.349 |
| 9 | 15 21 31.84 | 2.1204 | 21 10 48.4 | 10.260 |
| 10 | 15 23 39.27 | 2.1273 | 21 21 1.3 | 10.168 |
| 11 | 15 25 47.12 | 2.1343 | 21 31 8.6 | 10.076 |
| 12 | 15 27 55.39 | 2.1413 | 21 41 10.4 | 9.982 |
| 13 | 15 30 4.07 | 2.1482 | 21 51 6.5 | 9.887 |
| 14 | 15 32 13.17 | 2.1551 | 22 0 56.9 | 9.792 |
| 15 | 15 34 22.68 | 2.1620 | 22 10 41.5 | 9.694 |
| 16 | 15 36 32.61 | 2.1690 | 22 20 20.2 | 9.595 |
| 17 | 15 38 42.96 | 2.1761 | 22 29 52.9 | 9.495 |
| 18 | 15 40 53.74 | 2.1831 | 22 39 19.6 | 9.393 |
| 19 | 15 43 4.93 | 2.1901 | 22 48 40.1 | 9.289 |
| 20 | 15 45 16.54 | 2.1971 | 22 57 54.3 | 9.185 |
| 21 | 15 47 28.58 | 2.2042 | 23 7 2.3 | 9.080 |
| 22 | 15 49 41.04 | 2.2112 | 23 16 3.9 | 8.972 |
| 23 | 15 51 53.92 | 2.2182 | S.23 24 58.9 | 8.862 |

### MONDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 54 7.23 | 2.2253 | S.23 33 47.4 | 8.752 |
| 1 | 15 56 20.96 | 2.2323 | 23 42 29.2 | 8.641 |
| 2 | 15 58 35.11 | 2.2393 | 23 51 4.3 | 8.528 |
| 3 | 16 0 49.68 | 2.2463 | 23 59 32.6 | 8.414 |
| 4 | 16 3 4.67 | 2.2533 | 24 7 54.0 | 8.297 |
| 5 | 16 5 20.08 | 2.2603 | 24 16 8.3 | 8.180 |
| 6 | 16 7 35.91 | 2.2673 | 24 24 15.6 | 8.062 |
| 7 | 16 9 52.16 | 2.2743 | 24 32 15.7 | 7.941 |
| 8 | 16 12 8.82 | 2.2812 | 24 40 8.5 | 7.820 |
| 9 | 16 14 25.90 | 2.2881 | 24 47 54.1 | 7.698 |
| 10 | 16 16 43.39 | 2.2950 | 24 55 32.3 | 7.573 |
| 11 | 16 19 1.30 | 2.3019 | 25 3 2.9 | 7.447 |
| 12 | 16 21 19.62 | 2.3087 | 25 10 26.0 | 7.321 |
| 13 | 16 23 38.35 | 2.3155 | 25 17 41.4 | 7.192 |
| 14 | 16 25 57.48 | 2.3223 | 25 24 49.0 | 7.062 |
| 15 | 16 28 17.02 | 2.3289 | 25 31 48.8 | 6.931 |
| 16 | 16 30 36.95 | 2.3355 | 25 38 40.7 | 6.798 |
| 17 | 16 32 57.28 | 2.3422 | 25 45 24.6 | 6.665 |
| 18 | 16 35 18.01 | 2.3488 | 25 52 0.5 | 6.530 |
| 19 | 16 37 39.13 | 2.3553 | 25 58 28.2 | 6.392 |
| 20 | 16 40 0.64 | 2.3617 | 26 4 47.6 | 6.254 |
| 21 | 16 42 22.53 | 2.3681 | 26 10 58.7 | 6.115 |
| 22 | 16 44 44.81 | 2.3744 | 26 17 1.4 | 5.974 |
| 23 | 16 47 7.46 | 2.3806 | 26 22 55.6 | 5.832 |
| 24 | 16 49 30.48 | 2.3868 | S.26 28 41.2 | 5.688 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 17.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 49 30.48 | 2.3868 | S.26 28 41.2 | 5.686 |
| 1 | 16 51 53.87 | 2.3929 | 26 34 18.2 | 5.544 |
| 2 | 16 54 17.63 | 2.3990 | 26 39 46.5 | 5.398 |
| 3 | 16 56 41.75 | 2.4050 | 26 45 6.0 | 5.252 |
| 4 | 16 59 6.23 | 2.4108 | 26 50 16.7 | 5.103 |
| 5 | 17 1 31.05 | 2.4166 | 26 55 18.4 | 4.953 |
| 6 | 17 3 56.22 | 2.4223 | 27 0 11.1 | 4.802 |
| 7 | 17 6 21.73 | 2.4279 | 27 4 54.7 | 4.650 |
| 8 | 17 8 47.57 | 2.4335 | 27 9 29.1 | 4.497 |
| 9 | 17 11 13.75 | 2.4390 | 27 13 54.4 | 4.344 |
| 10 | 17 13 40.25 | 2.4443 | 27 18 10.4 | 4.188 |
| 11 | 17 16 7.06 | 2.4495 | 27 22 17.0 | 4.032 |
| 12 | 17 18 34.19 | 2.4547 | 27 26 14.3 | 3.876 |
| 13 | 17 21 1.62 | 2.4597 | 27 30 2.1 | 3.717 |
| 14 | 17 23 29.35 | 2.4646 | 27 33 40.3 | 3.556 |
| 15 | 17 25 57.37 | 2.4694 | 27 37 8.8 | 3.395 |
| 16 | 17 28 25.68 | 2.4741 | 27 40 27.7 | 3.233 |
| 17 | 17 30 54.26 | 2.4787 | 27 43 36.8 | 3.070 |
| 18 | 17 33 23.12 | 2.4832 | 27 46 36.1 | 2.907 |
| 19 | 17 35 52.24 | 2.4874 | 27 49 25.6 | 2.742 |
| 20 | 17 38 21.61 | 2.4916 | 27 52 5.1 | 2.576 |
| 21 | 17 40 51.22 | 2.4957 | 27 54 34.7 | 2.410 |
| 22 | 17 43 21.09 | 2.4996 | 27 56 54.3 | 2.242 |
| 23 | 17 45 51.18 | 2.5034 | S.27 59 3.8 | 2.073 |

### WEDNESDAY 18.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 48 21.50 | 2.5071 | S.28 1 3.1 | 1.904 |
| 1 | 17 50 52.03 | 2.5106 | 28 2 52.3 | 1.735 |
| 2 | 17 53 22.77 | 2.5140 | 28 4 31.3 | 1.564 |
| 3 | 17 55 53.71 | 2.5173 | 28 6 0.0 | 1.393 |
| 4 | 17 58 24.85 | 2.5205 | 28 7 18.5 | 1.222 |
| 5 | 18 0 56.17 | 2.5235 | 28 8 26.6 | 1.050 |
| 6 | 18 3 27.67 | 2.5263 | 28 9 24.4 | 0.877 |
| 7 | 18 5 59.33 | 2.5290 | 28 10 11.8 | 0.702 |
| 8 | 18 8 31.15 | 2.5316 | 28 10 48.7 | 0.527 |
| 9 | 18 11 3.12 | 2.5340 | 28 11 15.1 | 0.353 |
| 10 | 18 13 35.23 | 2.5363 | 28 11 31.1 | 0.178 |
| 11 | 18 16 7.47 | 2.5383 | 28 11 36.6 | 0.001 |
| 12 | 18 18 39.83 | 2.5403 | 28 11 31.3 | 0.176 |
| 13 | 18 21 12.31 | 2.5422 | 28 11 15.5 | 0.352 |
| 14 | 18 23 44.89 | 2.5438 | 28 10 49.1 | 0.527 |
| 15 | 18 26 17.56 | 2.5453 | 28 10 12.2 | 0.704 |
| 16 | 18 28 50.32 | 2.5466 | 28 9 24.6 | 0.882 |
| 17 | 18 31 23.15 | 2.5477 | 28 8 26.3 | 1.060 |
| 18 | 18 33 56.05 | 2.5488 | 28 7 17.4 | 1.238 |
| 19 | 18 36 29.01 | 2.5497 | 28 5 57.8 | 1.416 |
| 20 | 18 39 2.01 | 2.5504 | 28 4 27.5 | 1.595 |
| 21 | 18 41 35.06 | 2.5510 | 28 2 46.4 | 1.773 |
| 22 | 18 44 8.14 | 2.5514 | 28 0 54.7 | 1.951 |
| 23 | 18 46 41.23 | 2.5517 | 27 58 52.3 | 2.130 |
| 24 | 18 49 14.34 | 2.5518 | S.27 56 39.1 | 2.309 |

### THURSDAY 19.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 49 14.34 | 2.5518 | S.27 56 39.1 | 2.309 |
| 1 | 18 51 47.45 | 2.5518 | 27 54 15.2 | 2.487 |
| 2 | 18 54 20.56 | 2.5517 | 27 51 40.6 | 2.666 |
| 3 | 18 56 53.65 | 2.5513 | 27 48 55.4 | 2.843 |
| 4 | 18 59 26.71 | 2.5507 | 27 45 59.5 | 3.021 |
| 5 | 19 1 59.73 | 2.5501 | 27 42 52.9 | 3.200 |
| 6 | 19 4 32.72 | 2.5494 | 27 39 35.5 | 3.378 |
| 7 | 19 7 5.66 | 2.5484 | 27 36 7.5 | 3.555 |
| 8 | 19 9 38.53 | 2.5473 | 27 32 28.9 | 3.732 |
| 9 | 19 12 11.33 | 2.5461 | 27 28 39.7 | 3.908 |
| 10 | 19 14 44.06 | 2.5448 | 27 24 39.9 | 4.086 |
| 11 | 19 17 16.70 | 2.5433 | 27 20 29.5 | 4.263 |
| 12 | 19 19 49.25 | 2.5416 | 27 16 8.5 | 4.437 |
| 13 | 19 22 21.69 | 2.5397 | 27 11 37.0 | 4.612 |
| 14 | 19 24 54.02 | 2.5377 | 27 6 55.0 | 4.787 |
| 15 | 19 27 26.23 | 2.5357 | 27 2 2.5 | 4.962 |
| 16 | 19 29 58.31 | 2.5336 | 26 56 59.6 | 5.135 |
| 17 | 19 32 30.26 | 2.5313 | 26 51 46.3 | 5.308 |
| 18 | 19 35 2.07 | 2.5289 | 26 46 22.7 | 5.480 |
| 19 | 19 37 33.73 | 2.5263 | 26 40 48.7 | 5.651 |
| 20 | 19 40 5.23 | 2.5237 | 26 35 4.5 | 5.822 |
| 21 | 19 42 36.57 | 2.5208 | 26 29 10.0 | 5.993 |
| 22 | 19 45 7.73 | 2.5178 | 26 23 5.3 | 6.162 |
| 23 | 19 47 38.70 | 2.5147 | S.26 16 50.5 | 6.331 |

### FRIDAY 20.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 50 9.49 | 2.5115 | S.26 10 25.6 | 6.490 |
| 1 | 19 52 40.08 | 2.5082 | 26 3 50.6 | 6.667 |
| 2 | 19 55 10.47 | 2.5048 | 25 57 5.6 | 6.832 |
| 3 | 19 57 40.66 | 2.5014 | 25 50 10.7 | 6.997 |
| 4 | 20 0 10.64 | 2.4979 | 25 43 5.9 | 7.162 |
| 5 | 20 2 40.41 | 2.4944 | 25 35 51.2 | 7.327 |
| 6 | 20 5 9.97 | 2.4907 | 25 28 26.7 | 7.489 |
| 7 | 20 7 39.29 | 2.4867 | 25 20 52.5 | 7.650 |
| 8 | 20 10 8.37 | 2.4826 | 25 13 8.7 | 7.811 |
| 9 | 20 12 37.20 | 2.4785 | 25 5 15.2 | 7.971 |
| 10 | 20 15 5.79 | 2.4743 | 24 57 12.2 | 8.129 |
| 11 | 20 17 34.12 | 2.4701 | 24 48 59.7 | 8.287 |
| 12 | 20 20 2.20 | 2.4658 | 24 40 37.8 | 8.443 |
| 13 | 20 22 30.02 | 2.4615 | 24 32 6.6 | 8.597 |
| 14 | 20 24 57.58 | 2.4571 | 24 23 26.2 | 8.751 |
| 15 | 20 27 24.87 | 2.4526 | 24 14 36.5 | 8.904 |
| 16 | 20 29 51.89 | 2.4480 | 24 5 37.7 | 9.055 |
| 17 | 20 32 18.63 | 2.4434 | 23 56 29.9 | 9.205 |
| 18 | 20 34 45.09 | 2.4388 | 23 47 13.1 | 9.354 |
| 19 | 20 37 11.28 | 2.4341 | 23 37 47.4 | 9.502 |
| 20 | 20 39 37.18 | 2.4292 | 23 28 12.9 | 9.648 |
| 21 | 20 42 2.78 | 2.4242 | 23 18 29.6 | 9.793 |
| 22 | 20 44 28.08 | 2.4193 | 23 8 37.7 | 9.937 |
| 23 | 20 46 53.09 | 2.4144 | 22 58 37.2 | 10.079 |
| 24 | 20 49 17.81 | 2.4095 | S.22 48 28.2 | 10.220 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 49 17.81 | 2.4096 | S.22 48 28.2 | 10.220 |
| 1 | 20 51 42.24 | 2.4045 | 22 38 10.8 | 10.359 |
| 2 | 20 54 6.36 | 2.3993 | 22 27 45.1 | 10.498 |
| 3 | 20 56 30.16 | 2.3941 | 22 17 11.0 | 10.637 |
| 4 | 20 58 53.65 | 2.3890 | 22 6 28.7 | 10.772 |
| 5 | 21 1 16.84 | 2.3840 | 21 55 38.4 | 10.906 |
| 6 | 21 3 39.73 | 2.3789 | 21 44 40.1 | 11.037 |
| 7 | 21 6 2.31 | 2.3737 | 21 33 33.9 | 11.169 |
| 8 | 21 8 24.58 | 2.3686 | 21 22 19.8 | 11.299 |
| 9 | 21 10 46.53 | 2.3633 | 21 10 58.0 | 11.427 |
| 10 | 21 13 8.17 | 2.3580 | 20 59 28.5 | 11.556 |
| 11 | 21 15 29.49 | 2.3527 | 20 47 51.4 | 11.680 |
| 12 | 21 17 50.50 | 2.3475 | 20 36 6.9 | 11.803 |
| 13 | 21 20 11.20 | 2.3423 | 20 24 15.0 | 11.926 |
| 14 | 21 22 31.58 | 2.3371 | 20 12 15.8 | 12.047 |
| 15 | 21 24 51.65 | 2.3318 | 20 0 9.3 | 12.167 |
| 16 | 21 27 11.40 | 2.3266 | 19 47 55.7 | 12.286 |
| 17 | 21 29 30.84 | 2.3214 | 19 35 35.1 | 12.401 |
| 18 | 21 31 49.97 | 2.3162 | 19 23 7.6 | 12.516 |
| 19 | 21 34 8.79 | 2.3111 | 19 10 33.2 | 12.630 |
| 20 | 21 36 27.30 | 2.3059 | 18 57 52.0 | 12.742 |
| 21 | 21 38 45.50 | 2.3007 | 18 45 4.2 | 12.853 |
| 22 | 21 41 3.38 | 2.2955 | 18 32 9.8 | 12.961 |
| 23 | 21 43 20.96 | 2.2904 | S.18 19 8.9 | 13.068 |

### SUNDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 45 38.23 | 2.2853 | S.18 6 1.6 | 13.174 |
| 1 | 21 47 55.20 | 2.2803 | 17 52 48.0 | 13.278 |
| 2 | 21 50 11.87 | 2.2753 | 17 39 28.2 | 13.381 |
| 3 | 21 52 28.23 | 2.2702 | 17 26 2.3 | 13.482 |
| 4 | 21 54 44.29 | 2.2652 | 17 12 30.4 | 13.581 |
| 5 | 21 57 0.06 | 2.2603 | 16 58 52.6 | 13.679 |
| 6 | 21 59 15.53 | 2.2554 | 16 45 8.9 | 13.776 |
| 7 | 22 1 30.71 | 2.2506 | 16 31 19.5 | 13.871 |
| 8 | 22 3 45.60 | 2.2458 | 16 17 24.4 | 13.964 |
| 9 | 22 6 0.20 | 2.2410 | 16 3 23.8 | 14.056 |
| 10 | 22 8 14.51 | 2.2362 | 15 49 17.7 | 14.146 |
| 11 | 22 10 28.54 | 2.2316 | 15 35 6.3 | 14.234 |
| 12 | 22 12 42.30 | 2.2270 | 15 20 49.6 | 14.322 |
| 13 | 22 14 55.78 | 2.2224 | 15 6 27.7 | 14.407 |
| 14 | 22 17 8.99 | 2.2178 | 14 52 0.7 | 14.491 |
| 15 | 22 19 21.93 | 2.2134 | 14 37 28.8 | 14.572 |
| 16 | 22 21 34.60 | 2.2090 | 14 22 52.0 | 14.653 |
| 17 | 22 23 47.01 | 2.2046 | 14 8 10.4 | 14.733 |
| 18 | 22 25 59.15 | 2.2003 | 13 53 24.0 | 14.812 |
| 19 | 22 28 11.04 | 2.1961 | 13 38 33.0 | 14.887 |
| 20 | 22 30 22.68 | 2.1918 | 13 23 37.6 | 14.961 |
| 21 | 22 32 34.07 | 2.1878 | 13 8 37.7 | 15.035 |
| 22 | 22 34 45.22 | 2.1838 | 12 53 33.4 | 15.107 |
| 23 | 22 36 56.13 | 2.1798 | 12 38 24.9 | 15.176 |
| 24 | 22 39 6.80 | 2.1759 | S.12 23 12.3 | 15.244 |

### MONDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 39 6.80 | 2.1759 | S.12 23 12.3 | 15.244 |
| 1 | 22 41 17.24 | 2.1721 | 12 7 55.6 | 15.312 |
| 2 | 22 43 27.45 | 2.1683 | 11 52 34.9 | 15.377 |
| 3 | 22 45 37.43 | 2.1645 | 11 37 10.4 | 15.440 |
| 4 | 22 47 47.19 | 2.1609 | 11 21 42.1 | 15.502 |
| 5 | 22 49 56.74 | 2.1573 | 11 6 10.1 | 15.564 |
| 6 | 22 52 6.07 | 2.1538 | 10 50 34.4 | 15.624 |
| 7 | 22 54 15.20 | 2.1504 | 10 34 55.2 | 15.681 |
| 8 | 22 56 24.13 | 2.1471 | 10 19 12.7 | 15.737 |
| 9 | 22 58 32.85 | 2.1438 | 10 3 26.8 | 15.792 |
| 10 | 23 0 41.38 | 2.1407 | 9 47 37.7 | 15.844 |
| 11 | 23 2 49.73 | 2.1376 | 9 31 45.5 | 15.896 |
| 12 | 23 4 57.89 | 2.1346 | 9 15 50.2 | 15.946 |
| 13 | 23 7 5.87 | 2.1316 | 8 59 52.0 | 15.994 |
| 14 | 23 9 13.68 | 2.1288 | 8 43 50.9 | 16.042 |
| 15 | 23 11 21.32 | 2.1260 | 8 27 47.0 | 16.087 |
| 16 | 23 13 28.79 | 2.1233 | 8 11 40.4 | 16.131 |
| 17 | 23 15 36.11 | 2.1207 | 7 55 31.2 | 16.174 |
| 18 | 23 17 43.27 | 2.1181 | 7 39 19.5 | 16.215 |
| 19 | 23 19 50.28 | 2.1156 | 7 23 5.4 | 16.255 |
| 20 | 23 21 57.15 | 2.1132 | 7 6 48.9 | 16.293 |
| 21 | 23 24 3.87 | 2.1109 | 6 50 30.2 | 16.329 |
| 22 | 23 26 10.46 | 2.1087 | 6 34 9.4 | 16.364 |
| 23 | 23 28 16.92 | 2.1066 | S. 6 17 46.5 | 16.397 |

### TUESDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
|  | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 30 23.25 | 2.1046 | S. 6 1 21.7 | 16.429 |
| 1 | 23 32 29.46 | 2.1026 | 5 44 55.0 | 16.460 |
| 2 | 23 34 35.56 | 2.1008 | 5 28 26.5 | 16.490 |
| 3 | 23 36 41.56 | 2.0991 | 5 11 56.2 | 16.518 |
| 4 | 23 38 47.45 | 2.0973 | 4 55 24.3 | 16.544 |
| 5 | 23 40 53.24 | 2.0957 | 4 38 50.9 | 16.568 |
| 6 | 23 42 58.94 | 2.0943 | 4 22 16.1 | 16.592 |
| 7 | 23 45 4.55 | 2.0929 | 4 5 39.9 | 16.614 |
| 8 | 23 47 10.08 | 2.0916 | 3 49 2.4 | 16.635 |
| 9 | 23 49 15.54 | 2.0903 | 3 32 23.7 | 16.654 |
| 10 | 23 51 20.92 | 2.0892 | 3 15 43.9 | 16.671 |
| 11 | 23 53 26.24 | 2.0882 | 2 59 3.1 | 16.687 |
| 12 | 23 55 31.50 | 2.0872 | 2 42 21.4 | 16.702 |
| 13 | 23 57 36.70 | 2.0863 | 2 25 38.8 | 16.716 |
| 14 | 23 59 41.86 | 2.0855 | 2 8 55.5 | 16.727 |
| 15 | 0 1 46.97 | 2.0848 | 1 52 11.6 | 16.737 |
| 16 | 0 3 52.04 | 2.0843 | 1 35 27.1 | 16.746 |
| 17 | 0 5 57.08 | 2.0838 | 1 18 42.1 | 16.753 |
| 18 | 0 8 2.09 | 2.0833 | 1 1 56.7 | 16.759 |
| 19 | 0 10 7.08 | 2.0830 | 0 45 11.0 | 16.763 |
| 20 | 0 12 12.05 | 2.0828 | 0 28 25.1 | 16.767 |
| 21 | 0 14 17.01 | 2.0827 | S. 0 11 39.0 | 16.768 |
| 22 | 0 16 21.97 | 2.0827 | N. 0 5 7.1 | 16.767 |
| 23 | 0 18 26.93 | 2.0827 | 0 21 53.1 | 16.767 |
| 24 | 0 20 31.89 | 2.0828 | N. 0 38 39.1 | 16.764 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### WEDNESDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 20 31.89 | 2.0826 | N. 0 38 39.1 | 16.764 |
| 1 | 0 22 36.86 | 2.0830 | 0 55 24.8 | 16.759 |
| 2 | 0 24 41.85 | 2.0834 | 1 12 10.2 | 16.754 |
| 3 | 0 26 46.87 | 2.0838 | 1 28 55.3 | 16.747 |
| 4 | 0 28 51.91 | 2.0843 | 1 45 39.9 | 16.738 |
| 5 | 0 30 56.99 | 2.0850 | 2 2 23.9 | 16.728 |
| 6 | 0 33 2.11 | 2.0857 | 2 19 7.3 | 16.716 |
| 7 | 0 35 7.27 | 2.0864 | 2 35 49.9 | 16.703 |
| 8 | 0 37 12.48 | 2.0873 | 2 52 31.7 | 16.690 |
| 9 | 0 39 17.74 | 2.0882 | 3 9 12.7 | 16.675 |
| 10 | 0 41 23.06 | 2.0893 | 3 25 52.7 | 16.657 |
| 11 | 0 43 28.45 | 2.0905 | 3 42 31.5 | 16.638 |
| 12 | 0 45 33.92 | 2.0917 | 3 59 9.2 | 16.618 |
| 13 | 0 47 39.46 | 2.0930 | 4 15 45.7 | 16.596 |
| 14 | 0 49 45.08 | 2.0944 | 4 32 20.8 | 16.572 |
| 15 | 0 51 50.79 | 2.0959 | 4 48 54.4 | 16.547 |
| 16 | 0 53 56.59 | 2.0975 | 5 5 26.5 | 16.522 |
| 17 | 0 56 2.49 | 2.0992 | 5 21 57.0 | 16.495 |
| 18 | 0 58 8.49 | 2.1009 | 5 38 25.9 | 16.467 |
| 19 | 1 0 14.60 | 2.1028 | 5 54 53.0 | 16.436 |
| 20 | 1 2 20.83 | 2.1048 | 6 11 18.2 | 16.403 |
| 21 | 1 4 27.17 | 2.1068 | 6 27 41.4 | 16.370 |
| 22 | 1 6 33.64 | 2.1089 | 6 44 2.6 | 16.335 |
| 23 | 1 8 40.24 | 2.1111 | N. 7 0 21.6 | 16.298 |

### THURSDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 10 46.97 | 2.1133 | N. 7 16 38.4 | 16.261 |
| 1 | 1 12 53.84 | 2.1157 | 7 32 52.8 | 16.222 |
| 2 | 1 15 0.85 | 2.1182 | 7 49 4.9 | 16.182 |
| 3 | 1 17 8.02 | 2.1208 | 8 5 14.6 | 16.140 |
| 4 | 1 19 15.35 | 2.1235 | 8 21 21.7 | 16.095 |
| 5 | 1 21 22.84 | 2.1262 | 8 37 26.0 | 16.049 |
| 6 | 1 23 30.49 | 2.1289 | 8 53 27.6 | 16.002 |
| 7 | 1 25 38.30 | 2.1318 | 9 9 26.3 | 15.954 |
| 8 | 1 27 46.29 | 2.1348 | 9 25 22.1 | 15.905 |
| 9 | 1 29 54.47 | 2.1378 | 9 41 14.9 | 15.854 |
| 10 | 1 32 2.83 | 2.1409 | 9 57 4.6 | 15.801 |
| 11 | 1 34 11.38 | 2.1441 | 10 12 51.0 | 15.746 |
| 12 | 1 36 20.12 | 2.1473 | 10 28 34.1 | 15.690 |
| 13 | 1 38 29.05 | 2.1506 | 10 44 13.8 | 15.633 |
| 14 | 1 40 38.19 | 2.1541 | 10 59 50.1 | 15.575 |
| 15 | 1 42 47.54 | 2.1576 | 11 15 22.8 | 15.515 |
| 16 | 1 44 57.10 | 2.1612 | 11 30 51.9 | 15.453 |
| 17 | 1 47 6.88 | 2.1648 | 11 46 17.2 | 15.389 |
| 18 | 1 49 16.87 | 2.1684 | 12 1 38.6 | 15.324 |
| 19 | 1 51 27.08 | 2.1722 | 12 16 56.1 | 15.258 |
| 20 | 1 53 37.53 | 2.1761 | 12 32 9.6 | 15.190 |
| 21 | 1 55 48.21 | 2.1800 | 12 47 18.9 | 15.120 |
| 22 | 1 57 59.13 | 2.1840 | 13 2 24.0 | 15.049 |
| 23 | 2 0 10.29 | 2.1880 | 13 17 24.8 | 14.977 |
| 24 | 2 2 21.69 | 2.1921 | N.13 32 21.3 | 14.903 |

### FRIDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 2 21.69 | 2.1921 | N.13 32 21.3 | 14.903 |
| 1 | 2 4 33.34 | 2.1963 | 13 47 13.3 | 14.827 |
| 2 | 2 6 45.24 | 2.2005 | 14 2 0.6 | 14.750 |
| 3 | 2 8 57.40 | 2.2048 | 14 16 43.3 | 14.672 |
| 4 | 2 11 9.81 | 2.2091 | 14 31 21.2 | 14.592 |
| 5 | 2 13 22.49 | 2.2135 | 14 45 54.3 | 14.510 |
| 6 | 2 15 35.43 | 2.2179 | 15 0 22.4 | 14.427 |
| 7 | 2 17 48.64 | 2.2224 | 15 14 45.5 | 14.342 |
| 8 | 2 20 2.12 | 2.2270 | 15 29 3.4 | 14.255 |
| 9 | 2 22 15.88 | 2.2316 | 15 43 16.1 | 14.167 |
| 10 | 2 24 29.91 | 2.2363 | 15 57 23.5 | 14.077 |
| 11 | 2 26 44.23 | 2.2410 | 16 11 25.4 | 13.987 |
| 12 | 2 28 58.83 | 2.2458 | 16 25 21.9 | 13.895 |
| 13 | 2 31 13.72 | 2.2506 | 16 39 12.8 | 13.800 |
| 14 | 2 33 28.90 | 2.2554 | 16 52 57.9 | 13.704 |
| 15 | 2 35 44.36 | 2.2603 | 17 6 37.3 | 13.607 |
| 16 | 2 38 0.12 | 2.2652 | 17 20 10.8 | 13.508 |
| 17 | 2 40 16.18 | 2.2701 | 17 33 38.3 | 13.407 |
| 18 | 2 42 32.53 | 2.2750 | 17 46 59.7 | 13.306 |
| 19 | 2 44 49.18 | 2.2801 | 18 0 15.0 | 13.202 |
| 20 | 2 47 6.14 | 2.2852 | 18 13 24.0 | 13.097 |
| 21 | 2 49 23.40 | 2.2902 | 18 26 26.7 | 12.991 |
| 22 | 2 51 40.96 | 2.2953 | 18 39 23.0 | 12.883 |
| 23 | 2 53 58.83 | 2.3004 | N.18 52 12.7 | 12.774 |

### SATURDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 2 56 17.01 | 2.3055 | N.19 4 55.9 | 12.663 |
| 1 | 2 58 35.49 | 2.3106 | 19 17 32.3 | 12.550 |
| 2 | 3 0 54.28 | 2.3158 | 19 30 1.9 | 12.437 |
| 3 | 3 3 13.39 | 2.3211 | 19 42 24.7 | 12.322 |
| 4 | 3 5 32.81 | 2.3263 | 19 54 40.5 | 12.203 |
| 5 | 3 7 52.54 | 2.3314 | 20 6 49.1 | 12.084 |
| 6 | 3 10 12.58 | 2.3366 | 20 18 50.6 | 11.964 |
| 7 | 3 12 32.93 | 2.3418 | 20 30 44.8 | 11.843 |
| 8 | 3 14 53.60 | 2.3471 | 20 42 31.6 | 11.719 |
| 9 | 3 17 14.58 | 2.3523 | 20 54 11.1 | 11.596 |
| 10 | 3 19 35.87 | 2.3574 | 21 5 43.1 | 11.469 |
| 11 | 3 21 57.47 | 2.3625 | 21 17 7.4 | 11.342 |
| 12 | 3 24 19.37 | 2.3676 | 21 28 24.1 | 11.213 |
| 13 | 3 26 41.58 | 2.3728 | 21 39 33.0 | 11.083 |
| 14 | 3 29 4.11 | 2.3781 | 21 50 34.0 | 10.951 |
| 15 | 3 31 26.95 | 2.3832 | 22 1 27.1 | 10.817 |
| 16 | 3 33 50.09 | 2.3883 | 22 12 12.1 | 10.682 |
| 17 | 3 36 13.54 | 2.3933 | 22 22 49.0 | 10.547 |
| 18 | 3 38 37.29 | 2.3983 | 22 33 17.7 | 10.409 |
| 19 | 3 41 1.34 | 2.4033 | 22 43 38.1 | 10.270 |
| 20 | 3 43 25.69 | 2.4083 | 22 53 50.1 | 10.130 |
| 21 | 3 45 50.34 | 2.4133 | 23 3 53.7 | 9.990 |
| 22 | 3 48 15.29 | 2.4182 | 23 13 48.9 | 9.848 |
| 23 | 3 50 40.53 | 2.4230 | 23 23 35.5 | 9.703 |
| 24 | 3 53 6.05 | 2.4278 | N.23 33 13.3 | 9.557 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| SUNDAY 29. | | | | | MONDAY 30. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 3 53 6.05 | 2.4278 | N.23 33 13.3 | 9.557 | 0 | 4 52 35.15 | 2.5208 | N.26 37 51.3 | 5.730 |
| 1 | 3 55 31.86 | 2.4325 | 23 42 42.3 | 9.410 | 1 | 4 55 6.48 | 2.5234 | 26 43 30.0 | 5.559 |
| 2 | 3 57 57.95 | 2.4372 | 23 52 2.5 | 9.262 | 2 | 4 57 37.96 | 2.5259 | 26 48 58.4 | 5.388 |
| 3 | 4 0 24.33 | 2.4419 | 24 1 13.8 | 9.113 | 3 | 5 0 9.59 | 2.5284 | 26 54 16.6 | 5.217 |
| 4 | 4 2 50.98 | 2.4465 | 24 10 16.1 | 8.962 | 4 | 5 2 41.37 | 2.5307 | 26 59 24.4 | 5.044 |
| 5 | 4 5 17.91 | 2.4511 | 24 19 9.3 | 8.811 | 5 | 5 5 13.27 | 2.5327 | 27 4 21.8 | 4.871 |
| 6 | 4 7 45.11 | 2.4556 | 24 27 53.4 | 8.658 | 6 | 5 7 45.29 | 2.5347 | 27 9 8.9 | 4.697 |
| 7 | 4 10 12.58 | 2.4599 | 24 36 28.3 | 8.504 | 7 | 5 10 17.43 | 2.5365 | 27 13 45.5 | 4.522 |
| 8 | 4 12 40.30 | 2.4642 | 24 44 53.9 | 8.349 | 8 | 5 12 49.67 | 2.5383 | 27 18 11.6 | 4.347 |
| 9 | 4 15 8.28 | 2.4684 | 24 53 10.2 | 8.193 | 9 | 5 15 22.02 | 2.5400 | 27 22 27.2 | 4.171 |
| 10 | 4 17 36.51 | 2.4725 | 25 1 17.1 | 8.036 | 10 | 5 17 54.47 | 2.5414 | 27 26 32.2 | 3.995 |
| 11 | 4 20 4.98 | 2.4766 | 25 9 14.5 | 7.877 | 11 | 5 20 26.99 | 2.5426 | 27 30 26.6 | 3.819 |
| 12 | 4 22 33.70 | 2.4805 | 25 17 2.3 | 7.717 | 12 | 5 22 59.58 | 2.5438 | 27 34 10.5 | 3.642 |
| 13 | 4 25 2.65 | 2.4844 | 25 24 40.6 | 7.557 | 13 | 5 25 32.24 | 2.5448 | 27 37 43.7 | 3.465 |
| 14 | 4 27 31.83 | 2.4883 | 25 32 9.2 | 7.396 | 14 | 5 28 4.95 | 2.5457 | 27 41 6.3 | 3.288 |
| 15 | 4 30 1.25 | 2.4922 | 25 39 28.1 | 7.233 | 15 | 5 30 37.72 | 2.5465 | 27 44 18.4 | 3.111 |
| 16 | 4 32 30.89 | 2.4958 | 25 46 37.2 | 7.069 | 16 | 5 33 10.53 | 2.5471 | 27 47 19.8 | 2.934 |
| 17 | 4 35 0.74 | 2.4992 | 25 53 36.4 | 6.904 | 17 | 5 35 43.37 | 2.5475 | 27 50 10.5 | 2.757 |
| 18 | 4 37 30.79 | 2.5026 | 26 0 25.7 | 6.739 | 18 | 5 38 16.23 | 2.5477 | 27 52 50.6 | 2.579 |
| 19 | 4 40 1.05 | 2.5059 | 26 7 5.1 | 6.573 | 19 | 5 40 49.10 | 2.5478 | 27 55 20.0 | 2.401 |
| 20 | 4 42 31.50 | 2.5092 | 26 13 34.5 | 6.407 | 20 | 5 43 21.97 | 2.5478 | 27 57 38.7 | 2.223 |
| 21 | 4 45 2.15 | 2.5123 | 26 19 53.9 | 6.239 | 21 | 5 45 54.84 | 2.5477 | 27 59 46.8 | 2.046 |
| 22 | 4 47 32.98 | 2.5153 | 26 26 3.2 | 6.070 | 22 | 5 48 27.70 | 2.5474 | 28 1 44.2 | 1.867 |
| 23 | 4 50 3.98 | 2.5181 | 26 32 2.3 | 5.901 | 23 | 5 51 0.53 | 2.5469 | 28 3 30.9 | 1.689 |
| 24 | 4 52 35.15 | 2.5208 | N.26 37 51.3 | 5.730 | 24 | 5 53 33.33 | 2.5463 | N.28 5 6.9 | 1.511 |

## PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ● New Moon, . . . . . . . . . . | 2 | 11 | 39.6 |
| ☽ First Quarter, . . . . . . . . | 10 | 1 | 50.2 |
| ○ Full Moon, . . . . . . . . . | 17 | 23 | 51.9 |
| ☾ Last Quarter, . . . . . . . . | 24 | 22 | 17.5 |

| | Day. | h. |
|---|---|---|
| ☾ Apogee, . . . . . . . . . . . . | 11 | 1.4 |
| ☾ Perigee, . . . . . . . . . . . . | 24 | 21.1 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | IVh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 4 | Sun | W. | 20 0 30 | 2898 | 21 32 52 | 2905 | 23 5 4 | 2913 | 24 37 6 | 2924 |
| | Regulus | E. | 54 30 10 | 2515 | 52 49 18 | 2530 | 51 8 47 | 2545 | 49 28 37 | 2561 |
| | Mars | E. | 92 20 2 | 2580 | 90 40 39 | 2596 | 89 1 38 | 2611 | 87 22 58 | 2626 |
| | Spica | E. | 108 30 57 | 2604 | 106 49 49 | 2618 | 105 9 1 | 2633 | 103 28 34 | 2648 |
| 5 | Sun | W. | 32 13 50 | 2983 | 33 44 24 | 2996 | 35 14 42 | 3011 | 36 44 41 | 3025 |
| | Regulus | E. | 41 13 12 | 2642 | 39 35 14 | 2658 | 37 57 38 | 2675 | 36 20 25 | 2692 |
| | Mars | E. | 79 14 53 | 2704 | 77 38 19 | 2721 | 76 2 7 | 2737 | 74 26 16 | 2752 |
| | Spica | E. | 95 11 24 | 2622 | 93 33 0 | 2638 | 91 54 56 | 2652 | 90 17 12 | 2666 |
| 6 | Sun | W. | 44 10 7 | 3100 | 45 38 17 | 3114 | 47 6 10 | 3129 | 48 33 45 | 3143 |
| | Regulus | E. | 28 20 13 | 2783 | 26 45 23 | 2803 | 25 10 59 | 2824 | 23 37 2 | 2846 |
| | Mars | E. | 66 32 9 | 2831 | 64 58 21 | 2846 | 63 24 53 | 2861 | 61 51 44 | 2876 |
| | Spica | E. | 82 13 42 | · 2744 | 80 38 0 | 2758 | 79 2 37 | 2772 | 77 27 32 | 2785 |
| 7 | Sun | W. | 55 47 19 | 3214 | 57 13 11 | 3227 | 58 38 48 | 3241 | 60 4 9 | 3253 |
| | Pollux | W. | 21 14 44 | 2863 | 22 47 50 | 2874 | 24 20 43 | 2886 | 25 53 21 | 2897 |
| | Mars | E. | 54 10 41 | 2948 | 52 39 23 | 2962 | 51 8 22 | 2974 | 49 37 37 | 2987 |
| | Spica | E. | 69 36 41 | 2856 | 68 3 25 | 2869 | 66 30 24 | 2880 | 64 57 40 | 2892 |
| | Antares | E. | 115 30 10 | 2852 | 113 56 49 | 2865 | 112 23 45 | 2877 | 110 50 57 | 2890 |
| 8 | Sun | W. | 67 7 14 | 3314 | 68 31 9 | 3325 | 69 54 51 | 3336 | 71 18 21 | 3345 |
| | Pollux | W. | 33 32 57 | 2950 | 35 4 12 | 2959 | 36 35 16 | 2969 | 38 6 8 | 2978 |
| | Mars | E. | 42 7 48 | 3047 | 40 38 34 | 3058 | 39 9 33 | 3069 | 37 40 45 | 3079 |
| | Spica | E. | 57 17 46 | 2950 | 55 46 30 | 2959 | 54 15 26 | 2969 | 52 44 35 | 2979 |
| | Antares | E. | 103 10 42 | 2946 | 101 39 21 | 2956 | 100 8 13 | 2965 | 98 37 17 | 2974 |
| 9 | Sun | W. | 78 13 17 | 3386 | 79 35 49 | 3394 | 80 58 12 | 3401 | 82 20 27 | 3408 |
| | Pollux | W. | 45 37 43 | 3018 | 47 7 35 | 3024 | 48 37 18 | 3030 | 50 6 53 | 3036 |
| | Mars | E. | 30 19 42 | 3124 | 28 52 1 | 3131 | 27 24 30 | 3139 | 25 57 8 | 3146 |
| | Spica | E. | 45 13 8 | 3021 | 43 43 21 | 3028 | 42 13 43 | 3034 | 40 44 13 | 3040 |
| | Antares | E. | 91 5 21 | 3016 | 89 35 28 | 3022 | 88 5 43 | 3028 | 86 36 5 | 3034 |
| 10 | Sun | W. | 89 10 0 | 3433 | 90 31 39 | 3437 | 91 53 14 | 3438 | 93 14 47 | 3441 |
| | Pollux | W. | 57 33 13 | 3058 | 59 2 14 | 3061 | 60 31 12 | 3064 | 62 0 6 | 3065 |
| | Regulus | W. | 21 10 45 | 3122 | 22 38 28 | 3119 | 24 6 15 | 3114 | 25 34 7 | 3110 |
| | Spica | E. | 33 18 28 | 3066 | 31 49 37 | 3069 | 30 20 50 | 3073 | 28 52 8 | 3076 |
| | Antares | E. | 79 9 32 | 3056 | 77 40 29 | 3059 | 76 11 29 | 3062 | 74 42 33 | 3064 |
| 11 | Sun | W. | 100 2 5 | 3445 | 101 23 31 | 3445 | 102 44 57 | 3444 | 104 6 24 | 3443 |
| | Pollux | W. | 69 24 14 | 3068 | 70 53 3 | 3068 | 72 21 52 | 3066 | 73 50 43 | 3064 |
| | Regulus | W. | 32 54 27 | 3097 | 34 22 40 | 3093 | 35 50 58 | 3090 | 37 19 20 | 3087 |
| | Antares | E. | 67 18 17 | 3066 | 65 49 26 | 3067 | 64 20 36 | 3065 | 62 51 44 | 3063 |
| | α Aquilæ | E. | 113 59 33 | 4100 | 112 49 31 | 4077 | 111 39 7 | 4054 | 110 28 21 | 4034 |
| 12 | Sun | W. | 110 54 14 | 3426 | 112 16 0 | 3420 | 113 37 52 | 3415 | 114 59 51 | 3410 |
| | Pollux | W. | 81 15 44 | 3049 | 82 44 57 | 3043 | 84 14 16 | 3039 | 85 43 40 | 3034 |
| | Regulus | W. | 44 42 19 | 3065 | 46 11 12 | 3060 | 47 40 12 | 3054 | 49 9 18 | 3048 |
| | Antares | E. | 55 26 38 | 3047 | 53 57 24 | 3043 | 52 28 4 | 3038 | 50 58 38 | 3033 |
| | α Aquilæ | E. | 104 29 43 | 3944 | 103 17 8 | 3928 | 102 4 17 | 3914 | 100 51 11 | 3899 |
| 13 | Sun | W. | 121 51 27 | 3378 | 123 14 9 | 3371 | 124 36 59 | 3363 | 125 59 58 | 3356 |
| | Pollux | W. | 93 12 31 | 3002 | 94 42 41 | 2993 | 96 13 2 | 2985 | 97 43 33 | 2977 |
| | Regulus | W. | 56 36 48 | 3013 | 58 6 45 | 3005 | 59 36 52 | 2997 | 61 7 9 | 2988 |
| | Mars | W. | 16 7 58 | 3129 | 17 35 33 | 3119 | 19 3 20 | 3110 | 20 31 18 | 3100 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 4 | Sun | W. | 26 8 55 | 2934 | 27 40 31 | 2945 | 29 11 53 | 2958 | 30 42 59 | 2969 |
| | Regulus | E. | 47 48 48 | 2577 | 46 9 21 | 2593 | 44 30 16 | 2609 | 42 51 33 | 2626 |
| | Mars | E. | 85 44 39 | 2642 | 84 6 41 | 2657 | 82 29 4 | 2673 | 80 51 48 | 2689 |
| | Spica | E. | 101 48 27 | 2562 | 100 8 40 | 2577 | 98 29 14 | 2593 | 96 50 9 | 2607 |
| 5 | Sun | W. | 38 14 23 | 3039 | 39 43 47 | 3055 | 41 12 52 | 3071 | 42 41 38 | 3084 |
| | Regulus | E. | 34 43 36 | 2710 | 33 7 10 | 2728 | 31 31 7 | 2746 | 29 55 28 | 2764 |
| | Mars | E. | 72 50 45 | 2768 | 71 15 35 | 2784 | 69 40 46 | 2799 | 68 6 17 | 2815 |
| | Spica | E. | 88 39 50 | 2684 | 87 2 48 | 2698 | 85 26 6 | 2713 | 83 49 44 | 2729 |
| 6 | Sun | W. | 50 1 2 | 3158 | 51 28 2 | 3172 | 52 54 45 | 3187 | 54 21 10 | 3200 |
| | Regulus | E. | 22 3 32 | 2868 | 20 30 32 | 2894 | 18 58 5 | 2922 | 17 26 14 | 2952 |
| | Mars | E. | 60 18 54 | 2891 | 58 46 23 | 2905 | 57 14 11 | 2920 | 55 42 17 | 2934 |
| | Spica | E. | 75 52 45 | 2800 | 74 18 17 | 2814 | 72 44 7 | 2828 | 71 10 15 | 2842 |
| 7 | Sun | W. | 61 29 15 | 3266 | 62 54 6 | 3278 | 64 18 43 | 3291 | 65 43 5 | 3302 |
| | Pollux | W. | 27 25 44 | 2908 | 28 57 53 | 2918 | 30 29 48 | 2930 | 32 1 29 | 2940 |
| | Mars | E. | 48 7 8 | 3000 | 46 36 55 | 3013 | 45 6 58 | 3025 | 43 37 16 | 3036 |
| | Spica | E. | 63 25 11 | 2905 | 61 52 58 | 2916 | 60 21 0 | 2927 | 58 49 16 | 2939 |
| | Antares | E. | 109 18 25 | 2901 | 107 46 8 | 2912 | 106 14 5 | 2924 | 104 42 17 | 2935 |
| 8 | Sun | W. | 72 41 40 | 3355 | 74 4 48 | 3363 | 75 27 47 | 3371 | 76 50 37 | 3379 |
| | Pollux | W. | 39 36 48 | 2987 | 41 7 17 | 2996 | 42 37 35 | 3004 | 44 7 43 | 3010 |
| | Mars | E. | 36 12 10 | 3089 | 34 43 47 | 3098 | 33 15 34 | 3107 | 31 47 33 | 3115 |
| | Spica | E. | 51 13 56 | 2988 | 49 43 28 | 2997 | 48 13 11 | 3005 | 46 43 5 | 3013 |
| | Antares | E. | 97 6 32 | 2984 | 95 35 59 | 2992 | 94 5 36 | 3001 | 92 35 24 | 3008 |
| 9 | Sun | W. | 83 42 35 | 3415 | 85 4 35 | 3420 | 86 26 29 | 3425 | 87 48 17 | 3430 |
| | Pollux | W. | 51 36 21 | 3042 | 53 5 42 | 3046 | 54 34 58 | 3051 | 56 4 8 | 3055 |
| | Mars | E. | 24 29 54 | 3152 | 23 2 47 | 3158 | 21 35 47 | 3164 | 20 8 55 | 3169 |
| | Spica | E. | 39 14 50 | 3047 | 37 45 35 | 3052 | 36 16 26 | 3057 | 34 47 24 | 3062 |
| | Antares | E. | 85 6 34 | 3039 | 83 37 10 | 3044 | 82 7 52 | 3049 | 80 38 40 | 3052 |
| 10 | Sun | W. | 94 36 17 | 3442 | 95 57 46 | 3444 | 97 19 13 | 3446 | 98 40 39 | 3445 |
| | Pollux | W. | 63 28 58 | 3067 | 64 57 48 | 3068 | 66 26 37 | 3068 | 67 55 26 | 3069 |
| | Regulus | W. | 27 2 4 | 3108 | 28 30 4 | 3105 | 29 58 9 | 3102 | 31 26 16 | 3099 |
| | Spica | E. | 27 23 29 | 3079 | 25 54 54 | 3082 | 24 26 23 | 3085 | 22 57 55 | 3087 |
| | Antares | E. | 73 13 39 | 3066 | 71 44 48 | 3066 | 70 15 57 | 3067 | 68 47 7 | 3067 |
| 11 | Sun | W. | 105 27 52 | 3441 | 106 49 22 | 3438 | 108 10 55 | 3435 | 109 32 32 | 3431 |
| | Pollux | W. | 75 19 37 | 3062 | 76 48 33 | 3059 | 78 17 33 | 3056 | 79 46 36 | 3052 |
| | Regulus | W. | 38 47 46 | 3082 | 40 16 17 | 3079 | 41 44 52 | 3075 | 43 13 32 | 3069 |
| | Antares | E. | 61 22 49 | 3062 | 59 53 53 | 3058 | 58 24 52 | 3055 | 56 55 47 | 3052 |
| | α Aquilæ | E. | 109 17 15 | 4014 | 108 5 49 | 3996 | 106 54 5 | 3978 | 105 42 2 | 3960 |
| 12 | Sun | W. | 116 21 56 | 3404 | 117 44 8 | 3398 | 119 6 27 | 3392 | 120 28 53 | 3385 |
| | Pollux | W. | 87 13 11 | 3028 | 88 42 49 | 3022 | 90 12 35 | 3015 | 91 42 29 | 3009 |
| | Regulus | W. | 50 38 31 | 3042 | 52 7 52 | 3034 | 53 37 22 | 3027 | 55 7 1 | 3021 |
| | Antares | E. | 49 29 6 | 3028 | 47 59 28 | 3022 | 46 29 42 | 3015 | 44 59 48 | 3008 |
| | α Aquilæ | E. | 99 37 50 | 3886 | 98 24 16 | 3873 | 97 10 29 | 3860 | 95 56 29 | 3850 |
| 13 | Sun | W. | 127 23 5 | 3349 | 128 46 20 | 3341 | 130 9 44 | 3329 | 131 33 18 | 3314 |
| | Pollux | W. | 99 14 14 | 2969 | 100 45 5 | 2961 | 102 16 7 | 2951 | 103 47 21 | 2942 |
| | Regulus | W. | 62 37 37 | 2979 | 64 8 16 | 2969 | 65 39 7 | 2960 | 67 10 10 | 2950 |
| | Mars | W. | 21 59 28 | 3091 | 23 27 49 | 3081 | 24 56 22 | 3072 | 26 25 6 | 3061 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 13 | Antares E. | 43 29 45 | 3001 | 41 59 33 | 2993 | 40 29 12 | 2986 | 38 58 42 | 2977 |
| | α Aquilæ E. | 94 42 18 | 3838 | 93 27 55 | 3829 | 92 13 23 | 3820 | 90 58 41 | 3810 |
| | Fomalhaut E. | 124 26 43 | 3290 | 123 2 20 | 3274 | 121 37 38 | 3257 | 120 12 36 | 3240 |
| 14 | Pollux W. | 105 18 47 | 2931 | 106 50 26 | 2922 | 108 22 17 | 2912 | 109 54 21 | 2901 |
| | Regulus W. | 68 41 26 | 2940 | 70 12 54 | 2931 | 71 44 34 | 2920 | 73 16 27 | 2909 |
| | Mars W. | 27 54 3 | 3052 | 29 23 12 | 3041 | 30 52 34 | 3030 | 32 22 9 | 3020 |
| | Antares E. | 31 23 27 | 2932 | 29 51 49 | 2923 | 28 19 59 | 2912 | 26 47 56 | 2903 |
| | α Aquilæ E. | 84 42 55 | 3774 | 83 27 26 | 3769 | 82 11 52 | 3766 | 80 56 15 | 3762 |
| | Fomalhaut E. | 113 2 40 | 3163 | 111 35 46 | 3148 | 110 8 34 | 3133 | 108 41 5 | 3118 |
| 15 | Regulus W. | 80 59 25 | 2852 | 82 32 45 | 2842 | 84 6 19 | 2830 | 85 40 8 | 2818 |
| | Mars W. | 39 53 28 | 2963 | 41 24 27 | 2952 | 42 55 40 | 2940 | 44 27 8 | 2928 |
| | Spica W. | 26 56 13 | 2858 | 28 29 26 | 2845 | 30 2 56 | 2831 | 31 36 43 | 2819 |
| | α Aquilæ E. | 74 37 33 | 3761 | 73 21 50 | 3765 | 72 6 11 | 3770 | 70 50 38 | 3775 |
| | Fomalhaut E. | 101 19 14 | 3049 | 99 50 2 | 3035 | 98 20 33 | 3022 | 96 50 48 | 3009 |
| | α Pegasi E. | 121 28 2 | 3300 | 120 3 51 | 3275 | 118 39 10 | 3250 | 117 14 0 | 3226 |
| 16 | Regulus W. | 93 33 9 | 2757 | 95 8 33 | 2745 | 96 44 13 | 2732 | 98 20 10 | 2720 |
| | Mars W. | 52 8 19 | 2867 | 53 41 20 | 2855 | 55 14 37 | 2842 | 56 48 10 | 2829 |
| | Spica W. | 39 29 47 | 2755 | 41 5 14 | 2742 | 42 40 58 | 2730 | 44 16 59 | 2717 |
| | α Aquilæ E. | 64 35 4 | 3837 | 63 20 40 | 3855 | 62 6 34 | 3876 | 60 52 50 | 3901 |
| | Fomalhaut E. | 89 17 56 | 2946 | 87 46 35 | 2934 | 86 14 59 | 2923 | 84 43 9 | 2912 |
| | α Pegasi E. | 110 1 25 | 3119 | 108 33 38 | 3100 | 107 5 28 | 3081 | 105 36 56 | 3063 |
| | Jupiter E. | 124 51 17 | 2791 | 123 16 37 | 2779 | 121 41 41 | 2766 | 120 6 28 | 2753 |
| 17 | Regulus W. | 106 24 0 | 2660 | 108 1 33 | 2648 | 109 39 23 | 2637 | 111 17 28 | 2625 |
| | Mars W. | 64 39 57 | 2769 | 66 15 6 | 2756 | 67 50 31 | 2744 | 69 26 12 | 2732 |
| | Spica W. | 52 21 12 | 2655 | 53 58 53 | 2643 | 55 36 50 | 2630 | 57 15 4 | 2618 |
| | α Aquilæ E. | 54 51 33 | 4081 | 53 41 13 | 4131 | 52 31 41 | 4187 | 51 23 3 | 4249 |
| | Fomalhaut E. | 77 0 34 | 2861 | 75 27 25 | 2852 | 73 54 5 | 2844 | 72 20 34 | 2836 |
| | α Pegasi E. | 98 8 57 | 2984 | 96 38 24 | 2969 | 95 7 32 | 2955 | 93 36 23 | 2942 |
| | Jupiter E. | 112 6 14 | 2691 | 110 29 22 | 2679 | 108 52 14 | 2667 | 107 14 50 | 2655 |
| 18 | Mars W. | 77 28 30 | 2675 | 79 5 43 | 2665 | 80 43 10 | 2654 | 82 20 52 | 2643 |
| | Spica W. | 65 30 13 | 2561 | 67 10 2 | 2550 | 68 50 6 | 2539 | 70 30 25 | 2529 |
| | Antares W. | 19 35 50 | 2563 | 21 15 36 | 2551 | 22 55 39 | 2540 | 24 35 57 | 2528 |
| | Fomalhaut E. | 64 30 44 | 2808 | 62 56 26 | 2804 | 61 22 3 | 2801 | 59 47 37 | 2801 |
| | α Pegasi E. | 85 56 46 | 2887 | 84 24 11 | 2878 | 82 51 24 | 2869 | 81 18 25 | 2861 |
| | Jupiter E. | 99 3 45 | 2596 | 97 24 45 | 2586 | 95 45 31 | 2574 | 94 6 1 | 2564 |
| 19 | Mars W. | 90 32 53 | 2593 | 92 11 57 | 2584 | 93 51 14 | 2575 | 95 30 43 | 2566 |
| | Spica W. | 78 55 35 | 2479 | 80 37 18 | 2470 | 82 19 14 | 2460 | 84 1 23 | 2451 |
| | Antares W. | 33 1 11 | 2477 | 34 42 56 | 2468 | 36 24 54 | 2457 | 38 7 5 | 2450 |
| | Fomalhaut E. | 51 55 38 | 2814 | 50 21 27 | 2822 | 48 47 28 | 2832 | 47 13 42 | 2845 |
| | α Pegasi E. | 73 31 22 | 2835 | 71 57 40 | 2834 | 70 23 56 | 2832 | 68 50 10 | 2832 |
| | Jupiter E. | 85 44 57 | 2513 | 84 4 2 | 2503 | 82 22 53 | 2494 | 80 41 32 | 2485 |
| | α Arietis E. | 115 12 2 | 2537 | 113 31 40 | 2526 | 111 51 3 | 2516 | 110 10 12 | 2506 |
| 20 | Mars W. | 103 51 2 | 2526 | 105 31 39 | 2520 | 107 12 25 | 2512 | 108 53 21 | 2506 |
| | Spica W. | 92 35 10 | 2411 | 94 18 29 | 2404 | 96 1 58 | 2397 | 97 45 37 | 2390 |
| | Antares W. | 46 41 2 | 2410 | 48 24 23 | 2402 | 50 7 55 | 2395 | 51 51 37 | 2388 |
| | α Pegasi E. | 61 1 51 | 2852 | 59 28 30 | 2861 | 57 55 21 | 2872 | 56 22 26 | 2883 |
| | Jupiter E. | 72 11 46 | 2445 | 70 29 15 | 2437 | 68 46 33 | 2429 | 67 3 41 | 2422 |
| | α Arietis E. | 101 42 35 | 2460 | 100 0 26 | 2453 | 98 18 7 | 2445 | 96 35 37 | 2436 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 13 | Antares | E. | 37 28 1 | 2969 | 35 57 10 | 2960 | 34 26 7 | 2951 | 32 54 53 | 2942 |
| | α Aquilæ | E. | 89 43 49 | 3800 | 88 28 47 | 3792 | 87 13 37 | 3784 | 85 58 18 | 3780 |
| | Fomalhaut | E. | 118 47 14 | 3224 | 117 21 33 | 3209 | 115 55 34 | 3193 | 114 29 16 | 3178 |
| 14 | Pollux | W. | 111 26 39 | 2891 | 112 59 10 | 2880 | 114 31 55 | 2869 | 116 4 54 | 2858 |
| | Regulus | W. | 74 48 34 | 2898 | 76 20 55 | 2887 | 77 53 30 | 2876 | 79 26 20 | 2864 |
| | Mars | W. | 33 51 57 | 3009 | 35 21 58 | 2997 | 36 52 14 | 2986 | 38 22 44 | 2975 |
| | Antares | E. | 25 15 40 | 2892 | 23 43 11 | 2882 | 22 10 29 | 2870 | 20 37 22 | 2857 |
| | α Aquilæ | E. | 79 40 33 | 3759 | 78 24 48 | 3759 | 77 9 3 | 3759 | 75 53 18 | 3759 |
| | Fomalhaut | E. | 107 13 17 | 3103 | 105 45 11 | 3090 | 104 16 49 | 3076 | 102 48 10 | 3062 |
| 15 | Regulus | W. | 87 14 14 | 2806 | 88 48 34 | 2794 | 90 23 10 | 2782 | 91 58 1 | 2769 |
| | Mars | W. | 45 58 51 | 2916 | 47 30 49 | 2904 | 49 3 3 | 2891 | 50 35 33 | 2879 |
| | Spica | W. | 33 10 46 | 2806 | 34 45 6 | 2793 | 36 19 43 | 2780 | 37 54 37 | 2768 |
| | α Aquilæ | E. | 69 35 10 | 3784 | 68 19 51 | 3793 | 67 4 42 | 3806 | 65 49 46 | 3820 |
| | Fomalhaut | E. | 95 20 46 | 2996 | 93 50 28 | 2982 | 92 19 53 | 2969 | 90 49 2 | 2956 |
| | α Pegasi | E. | 115 48 22 | 3204 | 114 22 17 | 3181 | 112 55 45 | 3159 | 111 28 47 | 3139 |
| 16 | Regulus | W. | 99 56 23 | 2707 | 101 32 53 | 2695 | 103 9 39 | 2684 | 104 46 41 | 2672 |
| | Mars | W. | 58 22 0 | 2817 | 59 56 6 | 2805 | 61 30 27 | 2793 | 63 5 4 | 2781 |
| | Spica | W. | 45 53 16 | 2704 | 47 29 50 | 2692 | 49 6 41 | 2680 | 50 43 48 | 2667 |
| | α Aquilæ | E. | 59 39 31 | 3929 | 58 26 41 | 3959 | 57 14 21 | 3996 | 56 2 37 | 4036 |
| | Fomalhaut | E. | 83 11 5 | 2900 | 81 38 47 | 2891 | 80 6 16 | 2880 | 78 33 31 | 2870 |
| | α Pegasi | E. | 104 8 1 | 3046 | 102 38 45 | 3030 | 101 9 9 | 3013 | 99 39 12 | 2998 |
| | Jupiter | E. | 118 30 58 | 2741 | 116 55 12 | 2728 | 115 19 9 | 2716 | 113 42 50 | 2703 |
| 17 | Regulus | W. | 112 55 49 | 2614 | 114 34 25 | 2602 | 116 13 17 | 2591 | 117 52 25 | 2580 |
| | Mars | W. | 71 2 9 | 2721 | 72 38 21 | 2709 | 74 14 49 | 2698 | 75 51 32 | 2687 |
| | Spica | W. | 58 53 34 | 2607 | 60 32 20 | 2595 | 62 11 22 | 2583 | 63 50 40 | 2572 |
| | α Aquilæ | E. | 50 15 23 | 4320 | 49 8 49 | 4398 | 48 3 26 | 4485 | 46 59 21 | 4586 |
| | Fomalhaut | E. | 70 46 53 | 2828 | 69 13 2 | 2822 | 67 39 3 | 2817 | 66 4 57 | 2812 |
| | α Pegasi | E. | 92 4 57 | 2929 | 90 33 15 | 2918 | 89 1 19 | 2907 | 87 29 9 | 2897 |
| | Jupiter | E. | 105 37 9 | 2643 | 103 59 12 | 2631 | 102 20 59 | 2619 | 100 42 30 | 2607 |
| 18 | Mars | W. | 83 58 49 | 2632 | 85 37 0 | 2623 | 87 15 24 | 2612 | 88 54 2 | 2603 |
| | Spica | W. | 72 10 58 | 2518 | 73 51 46 | 2508 | 75 32 48 | 2497 | 77 14 5 | 2486 |
| | Antares | W. | 26 16 31 | 2517 | 27 57 20 | 2507 | 29 38 23 | 2497 | 31 19 40 | 2487 |
| | Fomalhaut | E. | 58 13 10 | 2801 | 56 38 44 | 2802 | 55 4 18 | 2804 | 53 29 56 | 2806 |
| | α Pegasi | E. | 79 45 16 | 2853 | 78 11 57 | 2848 | 76 38 31 | 2843 | 75 4 59 | 2839 |
| | Jupiter | E. | 92 26 17 | 2553 | 90 46 18 | 2543 | 89 6 5 | 2533 | 87 25 38 | 2523 |
| 19 | Mars | W. | 97 10 24 | 2558 | 98 50 17 | 2550 | 100 30 21 | 2542 | 102 10 36 | 2534 |
| | Spica | W. | 85 43 45 | 2443 | 87 26 19 | 2434 | 89 9 5 | 2426 | 90 52 2 | 2419 |
| | Antares | W. | 39 49 29 | 2441 | 41 32 5 | 2433 | 43 14 53 | 2425 | 44 57 52 | 2417 |
| | Fomalhaut | E. | 45 40 12 | 2860 | 44 7 2 | 2878 | 42 34 15 | 2900 | 41 1 56 | 2928 |
| | α Pegasi | E. | 67 16 24 | 2834 | 65 42 40 | 2835 | 64 8 58 | 2839 | 62 35 21 | 2845 |
| | Jupiter | E. | 78 59 58 | 2477 | 77 18 12 | 2469 | 75 36 15 | 2460 | 73 54 6 | 2453 |
| | α Arietis | E. | 108 29 7 | 2498 | 106 47 48 | 2487 | 105 6 16 | 2478 | 103 24 32 | 2469 |
| 20 | Mars | W. | 110 34 26 | 2499 | 112 15 40 | 2493 | 113 57 3 | 2487 | 115 38 35 | 2481 |
| | Spica | W. | 99 29 26 | 2383 | 101 13 25 | 2378 | 102 57 32 | 2371 | 104 41 48 | 2366 |
| | Antares | W. | 53 35 29 | 2382 | 55 19 30 | 2375 | 57 3 40 | 2369 | 58 47 59 | 2363 |
| | α Pegasi | E. | 54 49 46 | 2898 | 53 17 24 | 2916 | 51 45 25 | 2937 | 50 13 53 | 2961 |
| | Jupiter | E. | 65 20 39 | 2416 | 63 37 27 | 2410 | 61 54 7 | 2403 | 60 10 37 | 2398 |
| | α Arietis | E. | 94 52 57 | 2431 | 93 10 7 | 2425 | 91 27 8 | 2419 | 89 44 0 | 2413 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff | IXh. | P. L. of Diff |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 21 | Spica W. | 106 26 12 | 2360 | 108 10 44 | 2354 | 109 55 24 | 2350 | 111 40 11 | 2345 |
| | Antares W. | 60 32 27 | 2357 | 62 17 3 | 2353 | 64 1 46 | 2347 | 65 46 37 | 2343 |
| | *a* Pegasi E. | 48 42 51 | 2989 | 47 12 25 | 3019 | 45 42 36 | 3055 | 44 13 31 | 3096 |
| | Jupiter E. | 58 26 59 | 2392 | 56 43 13 | 2387 | 54 59 19 | 2382 | 53 15 18 | 2377 |
| | *a* Arietis E. | 88 0 44 | 2408 | 86 17 20 | 2403 | 84 33 49 | 2398 | 82 50 11 | 2394 |
| | Aldebaran E. | 118 27 47 | 2429 | 116 44 52 | 2420 | 115 1 46 | 2413 | 113 18 30 | 2406 |
| 22 | Antares W. | 74 32 29 | 2322 | 76 17 57 | 2317 | 78 3 31 | 2315 | 79 49 9 | 2311 |
| | Jupiter E. | 44 33 29 | 2354 | 42 48 48 | 2350 | 41 4 2 | 2347 | 39 19 11 | 2345 |
| | *a* Arietis E. | 74 10 35 | 2375 | 72 26 25 | 2373 | 70 42 12 | 2371 | 68 57 56 | 2370 |
| | Aldebaran E. | 104 39 57 | 2379 | 102 55 52 | 2375 | 101 11 42 | 2371 | 99 27 26 | 2368 |
| | Sun E. | 128 28 11 | 2650 | 126 50 24 | 2646 | 125 12 31 | 2640 | 123 34 31 | 2637 |
| 23 | Antares W. | 88 38 21 | 2298 | 90 24 23 | 2297 | 92 10 27 | 2295 | 93 56 34 | 2294 |
| | *a* Aquilæ W. | 48 18 7 | 4080 | 49 28 28 | 3984 | 50 40 23 | 3896 | 51 53 45 | 3819 |
| | *a* Arietis E. | 60 16 10 | 2366 | 58 31 47 | 2367 | 56 47 25 | 2368 | 55 3 5 | 2369 |
| | Aldebaran E. | 90 44 55 | 2353 | 89 0 13 | 2352 | 87 15 29 | 2350 | 85 30 42 | 2348 |
| | Sun E. | 115 23 17 | 2621 | 113 44 50 | 2618 | 112 6 19 | 2615 | 110 27 45 | 2614 |
| 24 | Antares W. | 102 47 39 | 2288 | 104 33 56 | 2287 | 106 20 15 | 2287 | 108 6 36 | 2286 |
| | *a* Aquilæ W. | 58 18 53 | 3518 | 59 38 57 | 3472 | 60 59 52 | 3431 | 62 21 33 | 3394 |
| | *a* Arietis E. | 46 22 12 | 2387 | 44 38 19 | 2392 | 42 54 33 | 2399 | 41 10 57 | 2407 |
| | Aldebaran E. | 76 46 25 | 2346 | 75 1 33 | 2346 | 73 16 41 | 2346 | 71 31 49 | 2347 |
| | Sun E. | 102 14 18 | 2606 | 100 35 31 | 2605 | 98 56 43 | 2604 | 97 17 54 | 2604 |
| 25 | *a* Aquilæ W. | 69 19 24 | 3253 | 70 44 30 | 3233 | 72 10 0 | 3214 | 73 35 52 | 3198 |
| | Fomalhaut W. | 37 48 18 | 2838 | 39 21 56 | 2800 | 40 56 24 | 2765 | 42 31 38 | 2735 |
| | *a* Arietis E. | 32 36 29 | 2473 | 30 54 38 | 2492 | 29 13 14 | 2516 | 27 32 23 | 2549 |
| | Aldebaran E. | 62 47 56 | 2357 | 61 3 19 | 2359 | 59 18 45 | 2362 | 57 34 16 | 2366 |
| | Sun E. | 89 3 42 | 2604 | 87 24 52 | 2604 | 85 46 3 | 2605 | 84 7 15 | 2606 |
| 26 | *a* Aquilæ W. | 80 49 13 | 3145 | 82 16 28 | 3138 | 83 43 51 | 3134 | 85 11 19 | 3133 |
| | Fomalhaut W. | 50 36 27 | 2628 | 52 14 44 | 2615 | 53 53 19 | 2601 | 55 32 12 | 2591 |
| | *a* Pegasi W. | 33 25 50 | 3569 | 34 45 9 | 3454 | 36 6 25 | 3360 | 37 29 27 | 3277 |
| | Aldebaran E. | 48 53 28 | 2394 | 47 9 44 | 2400 | 45 26 9 | 2408 | 43 42 46 | 2419 |
| | Sun E. | 75 53 36 | 2612 | 74 14 58 | 2615 | 72 36 23 | 2617 | 70 57 51 | 2619 |
| 27 | *a* Aquilæ W. | 92 28 42 | 3143 | 93 56 0 | 3148 | 95 23 12 | 3156 | 96 50 14 | 3165 |
| | Fomalhaut W. | 63 49 42 | 2556 | 65 29 38 | 2551 | 67 9 40 | 2548 | 68 49 46 | 2546 |
| | *a* Pegasi W. | 44 45 1 | 3001 | 46 15 13 | 2965 | 47 46 10 | 2931 | 49 17 49 | 2903 |
| | Jupiter W. | 25 40 26 | 2338 | 27 25 30 | 2342 | 29 10 29 | 2344 | 30 55 24 | 2347 |
| | Aldebaran E. | 35 9 57 | 2487 | 33 28 26 | 2507 | 31 47 23 | 2532 | 30 6 54 | 2559 |
| | Sun E. | 62 46 7 | 2635 | 61 7 59 | 2638 | 59 29 55 | 2641 | 57 51 57 | 2646 |
| 28 | *a* Aquilæ W. | 104 1 53 | 3238 | 105 27 17 | 3257 | 106 52 19 | 3278 | 108 16 56 | 3302 |
| | Fomalhaut W. | 77 10 41 | 2545 | 78 50 51 | 2548 | 80 30 57 | 2551 | 82 10 59 | 2554 |
| | *a* Pegasi W. | 57 3 53 | 2804 | 58 38 16 | 2792 | 60 12 55 | 2781 | 61 47 48 | 2771 |
| | Jupiter W. | 39 38 46 | 2366 | 41 23 10 | 2370 | 43 7 28 | 2375 | 44 51 39 | 2380 |
| | Sun E. | 49 43 43 | 2672 | 48 6 26 | 2679 | 46 29 18 | 2685 | 44 52 18 | 2692 |
| 29 | Fomalhaut W. | 90 29 55 | 2577 | 92 9 21 | 2585 | 93 48 36 | 2593 | 95 27 41 | 2600 |
| | *a* Pegasi W. | 69 44 39 | 2747 | 71 20 17 | 2745 | 72 55 57 | 2745 | 74 31 37 | 2746 |
| | Jupiter W. | 53 30 44 | 2406 | 55 14 10 | 2413 | 56 57 26 | 2419 | 58 40 33 | 2426 |
| | Sun E. | 36 49 53 | 2735 | 35 14 0 | 2745 | 33 38 20 | 2757 | 32 2 56 | 2769 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | | | P. L. of Diff. | XVh. | | | P. L. of Diff. | XVIIIh. | | | P. L. of Diff | XXIh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 21 | Spica | W. | 113 | 25 | 5 | 2340 | 115 | 10 | 6 | 2337 | 116 | 55 | 12 | 2333 | 118 | 40 | 23 | 2330 |
| | Antares | W. | 67 | 31 | 34 | 2338 | 69 | 16 | 38 | 2333 | 71 | 1 | 49 | 2329 | 72 | 47 | 6 | 2326 |
| | α Pegasi | E. | 42 | 45 | 16 | 3144 | 41 | 18 | 0 | 3198 | 39 | 51 | 49 | 3259 | 38 | 26 | 50 | 3342 |
| | Jupiter | E. | 51 | 31 | 10 | 2372 | 49 | 46 | 55 | 2367 | 48 | 2 | 33 | 2362 | 46 | 18 | 4 | 2358 |
| | α Arietis | E. | 81 | 6 | 27 | 2389 | 79 | 22 | 37 | 2385 | 77 | 38 | 41 | 2382 | 75 | 54 | 40 | 2379 |
| | Aldebaran | E. | 111 | 35 | 4 | 2400 | 109 | 51 | 29 | 2394 | 108 | 7 | 46 | 2389 | 106 | 23 | 55 | 2384 |
| 22 | Antares | W. | 81 | 34 | 52 | 2309 | 83 | 20 | 38 | 2306 | 85 | 6 | 29 | 2304 | 86 | 52 | 23 | 2301 |
| | Jupiter | E. | 37 | 34 | 17 | 2342 | 35 | 49 | 19 | 2339 | 34 | 4 | 17 | 2337 | 32 | 19 | 12 | 2335 |
| | α Arietis | E. | 67 | 13 | 38 | 2368 | 65 | 29 | 18 | 2367 | 63 | 44 | 56 | 2366 | 62 | 0 | 33 | 2366 |
| | Aldebaran | E. | 97 | 43 | 5 | 2364 | 95 | 58 | 39 | 2361 | 94 | 14 | 8 | 2358 | 92 | 29 | 33 | 2356 |
| | Sun | E. | 121 | 56 | 26 | 2632 | 120 | 18 | 15 | 2629 | 118 | 40 | 0 | 2626 | 117 | 1 | 41 | 2623 |
| 23 | Antares | W. | 95 | 42 | 43 | 2291 | 97 | 28 | 55 | 2291 | 99 | 15 | 8 | 2290 | 101 | 1 | 23 | 2289 |
| | α Aquilæ | W. | 53 | 8 | 28 | 3746 | 54 | 24 | 26 | 3681 | 55 | 41 | 33 | 3622 | 56 | 59 | 44 | 3568 |
| | α Arietis | E. | 53 | 18 | 46 | 2372 | 51 | 34 | 30 | 2374 | 49 | 50 | 19 | 2378 | 48 | 6 | 13 | 2382 |
| | Aldebaran | E. | 83 | 45 | 53 | 2347 | 82 | 1 | 3 | 2346 | 80 | 16 | 12 | 2346 | 78 | 31 | 18 | 2346 |
| | Sun | E. | 108 | 49 | 9 | 2612 | 107 | 10 | 30 | 2610 | 105 | 31 | 48 | 2608 | 103 | 53 | 4 | 2607 |
| 24 | Antares | W. | 109 | 52 | 56 | 2285 | 111 | 39 | 17 | 2285 | 113 | 25 | 39 | 2284 | 115 | 12 | 1 | 2283 |
| | α Aquilæ | W. | 63 | 43 | 56 | 3360 | 65 | 6 | 58 | 3330 | 66 | 30 | 35 | 3301 | 67 | 54 | 45 | 3276 |
| | α Arietis | E. | 39 | 27 | 32 | 2417 | 37 | 44 | 21 | 2428 | 36 | 1 | 25 | 2440 | 34 | 18 | 47 | 2454 |
| | Aldebaran | E. | 69 | 46 | 58 | 2348 | 68 | 2 | 8 | 2350 | 66 | 17 | 21 | 2352 | 64 | 32 | 37 | 2354 |
| | Sun | E. | 95 | 39 | 4 | 2604 | 94 | 0 | 14 | 2603 | 92 | 21 | 23 | 2603 | 90 | 42 | 32 | 2604 |
| 25 | α Aquilæ | W. | 75 | 2 | 3 | 3185 | 76 | 28 | 30 | 3173 | 77 | 55 | 12 | 3162 | 79 | 22 | 7 | 3153 |
| | Fomalhaut | W. | 44 | 7 | 32 | 2708 | 45 | 44 | 2 | 2684 | 47 | 21 | 3 | 2663 | 48 | 58 | 33 | 2645 |
| | α Arietis | E. | 25 | 52 | 18 | 2585 | 24 | 13 | 3 | 2627 | 22 | 34 | 45 | 2682 | 20 | 57 | 41 | 2786 |
| | Aldebaran | E. | 55 | 49 | 53 | 2371 | 54 | 5 | 36 | 2375 | 52 | 21 | 25 | 2380 | 50 | 37 | 22 | 2387 |
| | Sun | E. | 82 | 28 | 28 | 2607 | 80 | 49 | 42 | 2608 | 79 | 10 | 58 | 2610 | 77 | 32 | 16 | 2611 |
| 26 | α Aquilæ | W. | 86 | 38 | 49 | 3133 | 88 | 6 | 19 | 3132 | 89 | 33 | 50 | 3134 | 91 | 1 | 18 | 3138 |
| | Fomalhaut | W. | 57 | 11 | 19 | 2581 | 58 | 50 | 40 | 2574 | 60 | 30 | 11 | 2569 | 62 | 9 | 52 | 2560 |
| | α Pegasi | W. | 38 | 54 | 5 | 3206 | 40 | 20 | 7 | 3146 | 41 | 47 | 21 | 3091 | 43 | 15 | 42 | 3043 |
| | Aldebaran | E. | 41 | 59 | 38 | 2429 | 40 | 16 | 45 | 2441 | 38 | 34 | 8 | 2455 | 36 | 51 | 51 | 2471 |
| | Sun | E. | 69 | 19 | 22 | 2622 | 67 | 40 | 57 | 2625 | 66 | 2 | 30 | 2629 | 64 | 24 | 20 | 2631 |
| 27 | α Aquilæ | W. | 98 | 17 | 5 | 3177 | 99 | 43 | 42 | 3189 | 101 | 10 | 4 | 3204 | 102 | 36 | 8 | 3220 |
| | Fomalhaut | W. | 70 | 29 | 55 | 2545 | 72 | 10 | 6 | 2544 | 73 | 50 | 17 | 2543 | 75 | 30 | 30 | 2545 |
| | α Pegasi | W. | 50 | 50 | 4 | 2877 | 52 | 22 | 52 | 2856 | 53 | 56 | 8 | 2835 | 55 | 29 | 50 | 2819 |
| | Jupiter | W. | 32 | 40 | 15 | 2350 | 34 | 25 | 1 | 2355 | 36 | 9 | 41 | 2358 | 37 | 54 | 16 | 2362 |
| | Aldebaran | E. | 28 | 27 | 2 | 2590 | 26 | 47 | 53 | 2629 | 25 | 9 | 37 | 2677 | 23 | 32 | 26 | 2731 |
| | Sun | E. | 56 | 14 | 4 | 2651 | 54 | 36 | 18 | 2656 | 52 | 58 | 39 | 2661 | 51 | 21 | 7 | 2667 |
| 28 | α Aquilæ | W. | 109 | 41 | 5 | 3329 | 111 | 4 | 43 | 3358 | 112 | 27 | 48 | 3389 | 113 | 50 | 17 | 3423 |
| | Fomalhaut | W. | 83 | 50 | 57 | 2559 | 85 | 30 | 49 | 2561 | 87 | 10 | 37 | 2565 | 88 | 50 | 20 | 2571 |
| | α Pegasi | W. | 63 | 22 | 54 | 2763 | 64 | 58 | 10 | 2757 | 66 | 33 | 34 | 2753 | 68 | 9 | 4 | 2749 |
| | Jupiter | W. | 46 | 35 | 43 | 2384 | 48 | 19 | 40 | 2390 | 50 | 3 | 29 | 2396 | 51 | 47 | 11 | 2401 |
| | Sun | E. | 43 | 15 | 28 | 2700 | 41 | 38 | 48 | 2707 | 40 | 2 | 18 | 2716 | 38 | 26 | 0 | 2725 |
| 29 | Fomalhaut | W. | 97 | 6 | 36 | 2608 | 98 | 45 | 20 | 2618 | 100 | 23 | 51 | 2627 | 102 | 2 | 9 | 2638 |
| | α Pegasi | W. | 76 | 7 | 17 | 2747 | 77 | 42 | 54 | 2751 | 79 | 18 | 26 | 2755 | 80 | 53 | 52 | 2760 |
| | Jupiter | W. | 60 | 23 | 31 | 2433 | 62 | 6 | 19 | 2440 | 63 | 48 | 57 | 2447 | 65 | 31 | 25 | 2455 |
| | Sun | E. | 30 | 27 | 48 | 2784 | 28 | 52 | 59 | 2798 | 27 | 18 | 29 | 2815 | 25 | 44 | 20 | 2831 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S |  |  |  |  |  |  |  |  |  | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be added to Apparent Time.* |  | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | *Apparent* Right Ascension. |  |  | Diff. for 1 hour. | *Apparent* Declination. |  |  | Diff. for 1 hour. | Semi-diameter. |  |  |  |  |  |
|  |  | h. | m. | s. | s. | ° | ′ | ″ | ″ | ′ | ″ | s. | m. | s. | s. |
| Tues. | 1 | 6 | 42 | 26.58 | 10.340 | N.23 | 6 | 4.8 | 10.47 | 15 | 46.08 | 68.76 | 3 | 32.56 | 0.483 |
| Wed. | 2 | 6 | 46 | 34.62 | 10.329 | 23 | 1 | 41.0 | 11.48 | 15 | 46.07 | 68.72 | 3 | 44.01 | 0.472 |
| Thur. | 3 | 6 | 50 | 42.39 | 10.316 | 22 | 56 | 53.1 | 12.48 | 15 | 46.08 | 68.67 | 3 | 55.19 | 0.459 |
| Fri. | 4 | 6 | 54 | 49.86 | 10.303 | 22 | 51 | 41.2 | 13.48 | 15 | 46.09 | 68.63 | 4 | 6.07 | 0.447 |
| Sat. | 5 | 6 | 58 | 57.00 | 10.289 | 22 | 46 | 5.4 | 14.47 | 15 | 46.11 | 68.58 | 4 | 16.63 | 0.433 |
| *Sun.* | 6 | 7 | 3 | 3.75 | 10.273 | 22 | 40 | 5.7 | 15.47 | 15 | 46.13 | 68.53 | 4 | 26.80 | 0.418 |
| Mon. | 7 | 7 | 7 | 10.14 | 10.257 | 22 | 33 | 42.5 | 16.46 | 15 | 46.16 | 68.48 | 4 | 36.60 | 0.401 |
| Tues. | 8 | 7 | 11 | 16.13 | 10.240 | 22 | 26 | 55.9 | 17.42 | 15 | 46.19 | 68.44 | 4 | 46.01 | 0.384 |
| Wed. | 9 | 7 | 15 | 21.71 | 10.223 | 22 | 19 | 46.1 | 18.38 | 15 | 46.22 | 68.40 | 4 | 55.00 | 0.366 |
| Thur. | 10 | 7 | 19 | 26.86 | 10.205 | 22 | 12 | 13.2 | 19.33 | 15 | 46.26 | 68.34 | 5 | 3.58 | 0.348 |
| Fri. | 11 | 7 | 23 | 31.54 | 10.186 | 22 | 4 | 17.2 | 20.29 | 15 | 46.30 | 68.27 | 5 | 11.68 | 0.329 |
| Sat. | 12 | 7 | 27 | 35.77 | 10.166 | 21 | 55 | 58.6 | 21.23 | 15 | 46.36 | 68.20 | 5 | 19.33 | 0.310 |
| *Sun.* | 13 | 7 | 31 | 39.53 | 10.145 | 21 | 47 | 17.5 | 22.17 | 15 | 46.41 | 68.14 | 5 | 26.51 | 0.289 |
| Mon. | 14 | 7 | 35 | 42.77 | 10.124 | 21 | 38 | 14.2 | 23.09 | 15 | 46.46 | 68.07 | 5 | 33.19 | 0.267 |
| Tues. | 15 | 7 | 39 | 45.52 | 10.103 | 21 | 28 | 48.9 | 24.01 | 15 | 46.52 | 68.00 | 5 | 39.35 | 0.246 |
| Wed. | 16 | 7 | 43 | 47.74 | 10.082 | 21 | 19 | 1.7 | 24.91 | 15 | 46.59 | 67.93 | 5 | 45.00 | 0.225 |
| Thur. | 17 | 7 | 47 | 49.45 | 10.060 | 21 | 8 | 52.7 | 25.81 | 15 | 46.67 | 67.86 | 5 | 50.13 | 0.204 |
| Fri. | 18 | 7 | 51 | 50.63 | 10.038 | 20 | 58 | 22.2 | 26.69 | 15 | 46.74 | 67.78 | 5 | 54.75 | 0.182 |
| Sat. | 19 | 7 | 55 | 51.28 | 10.015 | 20 | 47 | 30.6 | 27.58 | 15 | 46.81 | 67.70 | 5 | 58.81 | 0.159 |
| *Sun.* | 20 | 7 | 59 | 51.39 | 9.993 | 20 | 36 | 17.8 | 28.45 | 15 | 46.89 | 67.63 | 6 | 2.36 | 0.136 |
| Mon. | 21 | 8 | 3 | 50.96 | 9.970 | 20 | 24 | 44.4 | 29.32 | 15 | 46.97 | 67.55 | 6 | 5.36 | 0.112 |
| Tues. | 22 | 8 | 7 | 49.96 | 9.948 | 20 | 12 | 50.4 | 30.16 | 15 | 47.04 | 67.47 | 6 | 7.79 | 0.089 |
| Wed. | 23 | 8 | 11 | 48.40 | 9.924 | 20 | 0 | 36.0 | 31.01 | 15 | 47.13 | 67.39 | 6 | 9.68 | 0.065 |
| Thur. | 24 | 8 | 15 | 46.30 | 9.901 | 19 | 48 | 1.5 | 31.84 | 15 | 47.22 | 67.31 | 6 | 11.01 | 0.043 |
| Fri. | 25 | 8 | 19 | 43.63 | 9.878 | 19 | 35 | 7.3 | 32.67 | 15 | 47.31 | 67.22 | 6 | 11.78 | 0.019 |
| Sat. | 26 | 8 | 23 | 40.38 | 9.854 | 19 | 21 | 53.4 | 33.47 | 15 | 47.40 | 67.14 | 6 | 11.98 | 0.004 |
| *Sun.* | 27 | 8 | 27 | 36.55 | 9.830 | 19 | 8 | 20.2 | 34.28 | 15 | 47.50 | 67.05 | 6 | 11.59 | 0.028 |
| Mon. | 28 | 8 | 31 | 32.18 | 9.805 | 18 | 54 | 27.9 | 35.06 | 15 | 47.61 | 66.95 | 6 | 10.66 | 0.052 |
| Tues. | 29 | 8 | 35 | 27.18 | 9.780 | 18 | 40 | 16.8 | 35.85 | 15 | 47.72 | 66.86 | 6 | 9.11 | 0.076 |
| Wed. | 30 | 8 | 39 | 21.58 | 9.755 | 18 | 25 | 47.1 | 36.60 | 15 | 47.83 | 66.77 | 6 | 6.97 | 0.101 |
| Thur. | 31 | 8 | 43 | 15.39 | 9.730 | 18 | 10 | 59.4 | 37.36 | 15 | 47.95 | 66.69 | 6 | 4.22 | 0.125 |
| Fri. | 32 | 8 | 47 | 8.59 | 9.705 | N.17 | 55 | 53.7 | 38.10 | 15 | 48.09 | 66.60 | 6 | 0.88 | 0.151 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | Equation of Time, *to be subtracted from Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Tues. | 1 | 6 42 25.97 | 10.340 | N.23 6 5.4 | 10.47 | 3 32.52 | 0.483 | 6 38 53.45 |
| Wed. | 2 | 6 46 33.98 | 10.329 | 23 1 41.7 | 11.48 | 3 43.97 | 0.472 | 6 42 50.01 |
| Thur. | 3 | 6 50 41.71 | 10.316 | 22 56 53.9 | 12.48 | 3 55.15 | 0.459 | 6 46 46.56 |
| Fri. | 4 | 6 54 49.15 | 10.303 | 22 51 42.1 | 13.48 | 4 6.03 | 0.447 | 6 50 43.12 |
| Sat. | 5 | 6 58 56.27 | 10.289 | 22 46 6.4 | 14.47 | 4 16.59 | 0.433 | 6 54 39.68 |
| *Sun.* | 6 | 7 3 3.00 | 10.273 | 22 40 6.8 | 15.47 | 4 26.76 | 0.418 | 6 58 36.24 |
| Mon. | 7 | 7 7 9.36 | 10.257 | 22 33 43.7 | 16.46 | 4 36.56 | 0.401 | 7 2 32.80 |
| Tues. | 8 | 7 11 15.32 | 10.240 | 22 26 57.2 | 17.42 | 4 45.97 | 0.384 | 7 6 29.35 |
| Wed. | 9 | 7 15 20.88 | 10.223 | 22 19 47.5 | 18.38 | 4 54.96 | 0.366 | 7 10 25.92 |
| Thur. | 10 | 7 19 26.01 | 10.205 | 22 12 14.7 | 19.33 | 5 3.54 | 0.348 | 7 14 22.47 |
| Fri. | 11 | 7 23 30.67 | 10.186 | 22 4 18.9 | 20.29 | 5 11.64 | 0.329 | 7 18 19.03 |
| Sat. | 12 | 7 27 34.88 | 10.166 | 21 56 0.4 | 21.23 | 5 19.29 | 0.310 | 7 22 15.59 |
| *Sun.* | 13 | 7 31 38.62 | 10.145 | 21 47 19.4 | 22.17 | 5 26.47 | 0.289 | 7 26 12.15 |
| Mon. | 14 | 7 35 41.85 | 10.124 | 21 38 16.2 | 23.09 | 5 33.15 | 0.267 | 7 30 8.70 |
| Tues. | 15 | 7 39 44.58 | 10.103 | 21 28 51.0 | 24.01 | 5 39.32 | 0.246 | 7 34 5.26 |
| Wed. | 16 | 7 43 46.79 | 10.082 | 21 19 3.9 | 24.91 | 5 44.97 | 0.225 | 7 38 1.82 |
| Thur. | 17 | 7 47 48.48 | 10.060 | 21 8 55.0 | 25.81 | 5 50.10 | 0.204 | 7 41 58.38 |
| Fri. | 18 | 7 51 49.65 | 10.038 | 20 58 24.7 | 26.69 | 5 54.72 | 0.182 | 7 45 54.93 |
| Sat. | 19 | 7 55 50.29 | 10.015 | 20 47 33.2 | 27.58 | 5 58.79 | 0.159 | 7 49 51.50 |
| *Sun.* | 20 | 7 59 50.39 | 9.993 | 20 36 20.6 | 28.45 | 6 2.34 | 0.136 | 7 53 48.05 |
| Mon. | 21 | 8 3 49.95 | 9.970 | 20 24 47.3 | 29.32 | 6 5.34 | 0.112 | 7 57 44.61 |
| Tues. | 22 | 8 7 48.94 | 9.948 | 20 12 53.4 | 30.16 | 6 7.77 | 0.089 | 8 1 41.17 |
| Wed. | 23 | 8 11 47.38 | 9.924 | 20 0 39.1 | 31.01 | 6 9.66 | 0.065 | 8 5 37.72 |
| Thur. | 24 | 8 15 45.28 | 9.901 | 19 48 4.7 | 31.84 | 6 11.00 | 0.043 | 8 9 34.28 |
| Fri. | 25 | 8 19 42.61 | 9.878 | 19 35 10.5 | 32.67 | 6 11.77 | 0.019 | 8 13 30.84 |
| Sat. | 26 | 8 23 39.37 | 9.854 | 19 21 56.7 | 33.47 | 6 11.98 | 0.004 | 8 17 27.39 |
| *Sun.* | 27 | 8 27 35.54 | 9.830 | 19 8 23.6 | 34.28 | 6 11.59 | 0.028 | 8 21 23.95 |
| Mon. | 28 | 8 31 31.17 | 9.805 | 18 54 31.4 | 35.06 | 6 10.66 | 0.052 | 8 25 20.51 |
| Tues. | 29 | 8 35 26.18 | 9.780 | 18 40 20.3 | 35.85 | 6 9.11 | 0.076 | 8 29 17.07 |
| Wed. | 30 | 8 39 20.59 | 9.755 | 18 25 50.7 | 36.60 | 6 6.97 | 0.101 | 8 33 13.62 |
| Thur. | 31 | 8 43 14.41 | 9.730 | 18 11 3.0 | 37.36 | 6 4.23 | 0.125 | 8 37 10.18 |
| Fri. | 32 | 8 47 7.63 | 9.705 | N.17 55 57.4 | 38.10 | 6 0.89 | 0.151 | 8 41 6.74 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 183 | 99 45 16.1 | 44 56.4 | 143.08 | +0.34 | 0.0072475 | 1.0 | 17 18 15.99 |
| 2 | 184 | 100 42 29.1 | 42 9.2 | 143.03 | 0.40 | .0072486 | 0.2 | 17 14 20.08 |
| 3 | 185 | 101 39 42.0 | 39 22.0 | 143.04 | 0.42 | .0072469 | 1.2 | 17 10 24.17 |
| 4 | 186 | 102 36 55.0 | 36 34.8 | 143.04 | 0.40 | .0072427 | 2.3 | 17 6 28.26 |
| 5 | 187 | 103 34 7.9 | 33 47.5 | 143.04 | 0.37 | .0072360 | 3.3 | 17 2 32.35 |
| 6 | 188 | 104 31 20.9 | 31 0.3 | 143.04 | 0.30 | .0072266 | 4.3 | 16 58 36.43 |
| 7 | 189 | 105 28 33.7 | 28 12.9 | 143.03 | 0.21 | .0072147 | 5.3 | 16 54 40.51 |
| 8 | 190 | 106 25 46.4 | 25 25.4 | 143.03 | +0.11 | .0072005 | 6.3 | 16 50 44.61 |
| 9 | 191 | 107 22 59.1 | 22 37.9 | 143.03 | —0.02 | .0071840 | 7.3 | 16 46 48.69 |
| 10 | 192 | 108 20 11.7 | 19 50.3 | 143.03 | 0.16 | .0071653 | 8.1 | 16 42 52.78 |
| 11 | 193 | 109 17 24.3 | 17 2.7 | 143.03 | 0.28 | .0071446 | 8.8 | 16 38 56.87 |
| 12 | 194 | 110 14 37.0 | 14 15.2 | 143.04 | 0.40 | .0071221 | 9.5 | 16 35 0.96 |
| 13 | 195 | 111 11 49.9 | 11 28.0 | 143.04 | 0.51 | .0070977 | 10.3 | 16 31 5.04 |
| 14 | 196 | 112 9 2.7 | 8 40.6 | 143.05 | 0.60 | .0070718 | 11.1 | 16 27 9.13 |
| 15 | 197 | 113 6 15.7 | 5 53.4 | 143.06 | 0.66 | .0070444 | 11.7 | 16 23 13.22 |
| 16 | 198 | 114 3 28.9 | 3 6.4 | 143.07 | 0.69 | .0070155 | 12.3 | 16 19 17.31 |
| 17 | 199 | 115 0 42.6 | 0 19.9 | 143.09 | 0.69 | .0069852 | 12.9 | 16 15 21.40 |
| 18 | 200 | 115 57 56.9 | 57 34.1 | 143.11 | 0.66 | .0069535 | 13.5 | 16 11 25.49 |
| 19 | 201 | 116 55 11.8 | 54 48.9 | 143.13 | 0.59 | .0069203 | 14.1 | 16 7 29.56 |
| 20 | 202 | 117 52 27.3 | 52 4.2 | 143.16 | 0.52 | .0068857 | 14.7 | 16 3 33.66 |
| 21 | 203 | 118 49 43.5 | 49 20.2 | 143.19 | 0.42 | .0068497 | 15.4 | 15 59 37.75 |
| 22 | 204 | 119 47 0.4 | 46 37.0 | 143.23 | 0.28 | .0068122 | 16.1 | 15 55 41.83 |
| 23 | 205 | 120 44 18.3 | 43 54.7 | 143.27 | 0.15 | .0067729 | 16.8 | 15 51 45.93 |
| 24 | 206 | 121 41 37.3 | 41 13.5 | 143.31 | —0.01 | .0067319 | 17.5 | 15 47 50.01 |
| 25 | 207 | 122 38 57.3 | 38 33.4 | 143.35 | +0.11 | .0066891 | 18.3 | 15 43 54.10 |
| 26 | 208 | 123 36 18.3 | 35 54.2 | 143.39 | 0.24 | .0066444 | 19.2 | 15 39 58.19 |
| 27 | 209 | 124 33 40.3 | 33 16.0 | 143.44 | 0.34 | .0065975 | 20.0 | 15 36 2.28 |
| 28 | 210 | 125 31 3.4 | 30 38.9 | 143.48 | 0.43 | .0065482 | 20.9 | 15 32 6.37 |
| 29 | 211 | 126 28 27.5 | 28 2.9 | 143.52 | 0.50 | .0064966 | 21.9 | 15 28 10.47 |
| 30 | 212 | 127 25 52.6 | 25 27.8 | 143.56 | 0.52 | .0064429 | 22.9 | 15 24 14.54 |
| 31 | 213 | 128 23 18.6 | 22 53.6 | 143.60 | 0.51 | .0063868 | 23.9 | 15 20 18.64 |
| 32 | 214 | 129 20 45.6 | 20 20.4 | 143.64 | +0.49 | 0.0063283 | 24.9 | 15 16 22.73 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 15 44.4 | 15 39.8 | 57 39.4 | −1.36 | 57 22.5 | −1.44 | ☌ | | 28.5 |
| 2 | 15 35.0 | 15 30.1 | 57 4.9 | 1.49 | 56 46.8 | 1.52 | 0 11.7 | 2.43 | 0.1 |
| 3 | 15 25.1 | 15 20.1 | 56 28.5 | 1.52 | 56 10.3 | 1.50 | 1 8.0 | 2.27 | 1.1 |
| 4 | 15 15.3 | 15 10.7 | 55 52.6 | 1.45 | 55 35.6 | 1.38 | 2 0.2 | 2.09 | 2.1 |
| 5 | 15 6.3 | 15 2.2 | 55 19.5 | 1.29 | 55 4.6 | 1.18 | 2 48.1 | 1.91 | 3.1 |
| 6 | 14 58.6 | 14 55.5 | 54 51.3 | 1.04 | 54 39.7 | 0.89 | 3 32.1 | 1.77 | 4.1 |
| 7 | 14 52.8 | 14 50.7 | 54 30.0 | 0.72 | 54 22.5 | 0.53 | 4 13.3 | 1.67 | 5.1 |
| 8 | 14 49.3 | 14 48.6 | 54 17.3 | −0.33 | 54 14.5 | −0.12 | 4 52.7 | 1.62 | 6.1 |
| 9 | 14 48.6 | 14 49.2 | 54 14.3 | +0.09 | 54 16.6 | +0.30 | 5 31.5 | 1.63 | 7.1 |
| 10 | 14 50.5 | 14 52.6 | 54 21.5 | 0.52 | 54 29.0 | 0.73 | 6 11.1 | 1.68 | 8.1 |
| 11 | 14 55.3 | 14 58.7 | 54 39.0 | 0.93 | 54 51.4 | 1.13 | 6 52.6 | 1.78 | 9.1 |
| 12 | 15 2.7 | 15 7.2 | 55 6.1 | 1.31 | 55 22.8 | 1.47 | 7 37.1 | 1.92 | 10.1 |
| 13 | 15 12.2 | 15 17.7 | 55 41.3 | 1.60 | 56 1.3 | 1.72 | 8 25.7 | 2.11 | 11.1 |
| 14 | 15 23.5 | 15 29.5 | 56 22.5 | 1.80 | 56 44.6 | 1.86 | 9 18.9 | 2.30 | 12.1 |
| 15 | 15 35.6 | 15 41.8 | 57 7.1 | 1.88 | 57 29.7 | 1.87 | 10 16.3 | 2.46 | 13.1 |
| 16 | 15 47.8 | 15 53.6 | 57 51.9 | 1.82 | 58 13.3 | 1.73 | 11 16.3 | 2.53 | 14.1 |
| 17 | 15 59.1 | 16 4.1 | 58 33.5 | 1.61 | 58 52.0 | 1.45 | 12 16.5 | 2.48 | 15.1 |
| 18 | 16 8.6 | 16 12.5 | 59 8.4 | 1.27 | 59 22.5 | 1.07 | 13 14.6 | 2.36 | 16.1 |
| 19 | 16 15.6 | 16 18.0 | 59 34.0 | 0.84 | 59 42.7 | 0.61 | 14 9.5 | 2.22 | 17.1 |
| 20 | 16 19.6 | 16 20.5 | 59 48.6 | +0.38 | 59 51.8 | +0.15 | 15 1.3 | 2.10 | 18.1 |
| 21 | 16 20.6 | 16 20.1 | 59 52.3 | −0.06 | 59 50.4 | −0.26 | 15 50.7 | 2.02 | 19.1 |
| 22 | 16 18.9 | 16 17.2 | 59 46.1 | 0.44 | 59 39.8 | 0.60 | 16 39.0 | 2.01 | 20.1 |
| 23 | 16 15.0 | 16 12.4 | 59 31.8 | 0.73 | 59 22.3 | 0.84 | 17 27.7 | 2.05 | 21.1 |
| 24 | 16 9.5 | 16 6.3 | 59 11.6 | 0.93 | 58 59.9 | 1.00 | 18 18.0 | 2.14 | 22.1 |
| 25 | 16 2.9 | 15 59.4 | 58 47.5 | 1.06 | 58 34.4 | 1.12 | 19 10.9 | 2.25 | 23.1 |
| 26 | 15 55.7 | 15 51.9 | 58 20.7 | 1.16 | 58 6.6 | 1.19 | 20 6.6 | 2.37 | 24.1 |
| 27 | 15 47.9 | 15 43.9 | 57 52.1 | 1.22 | 57 37.3 | 1.25 | 21 4.4 | 2.44 | 25.1 |
| 28 | 15 39.7 | 15 35.5 | 57 22.2 | 1.27 | 57 6.8 | 1.29 | 22 2.7 | 2.42 | 26.1 |
| 29 | 15 31.3 | 15 27.1 | 56 51.3 | 1.30 | 56 35.7 | 1.30 | 22 59.3 | 2.29 | 27.1 |
| 30 | 15 22.8 | 15 18.6 | 56 20.2 | 1.29 | 56 4.8 | 1.27 | 23 52.5 | 2.12 | 28.1 |
| 31 | 15 14.5 | 15 10.5 | 55 49.7 | 1.24 | 55 35.0 | 1.20 | ☌ | | 29.1 |
| 32 | 15 6.7 | 15 3.0 | 55 20.8 | −1.15 | 55 7.3 | −1.08 | 0 41.8 | 1.97 | 0.6 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | **TUESDAY 1.** | | | | | **THURSDAY 3.** | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 5 53 33.33 | 2.5463 | N.28 5 6.9 | 1.511 | 0 | 7 52 20.32 | 2.3563 | N.26 2 17.0 | 6.301 |
| 1 | 5 56 6.09 | 2.5454 | 28 6 32.2 | 1.334 | 1 | 7 54 41.51 | 2.3500 | 25 55 54.8 | 6.438 |
| 2 | 5 58 38.79 | 2.5445 | 28 7 46.9 | 1.157 | 2 | 7 57 2.32 | 2.3437 | 25 49 24.4 | 6.574 |
| 3 | 6 1 11.43 | 2.5434 | 28 8 51.0 | 0.980 | 3 | 7 59 22.75 | 2.3372 | 25 42 45.9 | 6.709 |
| 4 | 6 3 44.00 | 2.5422 | 28 9 44.5 | 0.802 | 4 | 8 1 42.78 | 2.3304 | 25 35 59.3 | 6.843 |
| 5 | 6 6 16.49 | 2.5408 | 28 10 27.3 | 0.626 | 5 | 8 4 2.40 | 2.3236 | 25 29 4.7 | 6.976 |
| 6 | 6 8 48.89 | 2.5392 | 28 10 59.5 | 0.447 | 6 | 8 6 21.61 | 2.3169 | 25 22 2.2 | 7.107 |
| 7 | 6 11 21.19 | 2.5375 | 28 11 21.0 | 0.271 | 7 | 8 8 40.42 | 2.3102 | 25 14 51.9 | 7.235 |
| 8 | 6 13 53.39 | 2.5357 | 28 11 32.0 | 0.096 | 8 | 8 10 58.86 | 2.3035 | 25 7 34.0 | 7.362 |
| 9 | 6 16 25.48 | 2.5337 | 28 11 32.5 | 0.079 | 9 | 8 13 16.87 | 2.2967 | 25 0 8.5 | 7.488 |
| 10 | 6 18 57.44 | 2.5316 | 28 11 22.5 | 0.254 | 10 | 8 15 34.47 | 2.2899 | 24 52 35.4 | 7.612 |
| 11 | 6 21 29.27 | 2.5293 | 28 11 2.0 | 0.429 | 11 | 8 17 51.66 | 2.2831 | 24 44 54.8 | 7.737 |
| 12 | 6 24 0.96 | 2.5268 | 28 10 31.0 | 0.603 | 12 | 8 20 8.44 | 2.2762 | 24 37 6.9 | 7.859 |
| 13 | 6 26 32.49 | 2.5242 | 28 9 49.6 | 0.777 | 13 | 8 22 24.81 | 2.2693 | 24 29 11.7 | 7.980 |
| 14 | 6 29 3.86 | 2.5214 | 28 8 57.8 | 0.950 | 14 | 8 24 40.76 | 2.2624 | 24 21 9.3 | 8.099 |
| 15 | 6 31 35.06 | 2.5185 | 28 7 55.6 | 1.122 | 15 | 8 26 56.30 | 2.2555 | 24 12 59.8 | 8.217 |
| 16 | 6 34 6.08 | 2.5155 | 28 6 43.1 | 1.294 | 16 | 8 29 11.42 | 2.2485 | 24 4 43.3 | 8.332 |
| 17 | 6 36 36.92 | 2.5124 | 28 5 20.3 | 1.465 | 17 | 8 31 26.12 | 2.2414 | 23 56 19.8 | 8.449 |
| 18 | 6 39 7.58 | 2.5091 | 28 3 47.2 | 1.636 | 18 | 8 33 40.39 | 2.2344 | 23 47 49.4 | 8.563 |
| 19 | 6 41 38.03 | 2.5056 | 28 2 3.9 | 1.806 | 19 | 8 35 54.24 | 2.2274 | 23 39 12.2 | 8.676 |
| 20 | 6 44 8.26 | 2.5020 | 28 0 10.5 | 1.974 | 20 | 8 38 7.68 | 2.2204 | 23 30 28.3 | 8.787 |
| 21 | 6 46 38.27 | 2.4983 | 27 58 7.0 | 2.142 | 21 | 8 40 20.70 | 2.2134 | 23 21 37.8 | 8.897 |
| 22 | 6 49 8.06 | 2.4945 | 27 55 53.4 | 2.310 | 22 | 8 42 33.30 | 2.2064 | 23 12 40.7 | 9.006 |
| 23 | 6 51 37.61 | 2.4906 | N.27 53 29.8 | 2.476 | 23 | 8 44 45.47 | 2.1993 | N.23 3 37.2 | 9.111 |
| | **WEDNESDAY 2.** | | | | | **FRIDAY 4.** | | | |
| 0 | 6 54 6.93 | 2.4866 | N.27 50 56.3 | 2.641 | 0 | 8 46 57.21 | 2.1922 | N.22 54 27.4 | 9.215 |
| 1 | 6 56 36.00 | 2.4823 | 27 48 12.9 | 2.806 | 1 | 8 49 8.53 | 2.1853 | 22 45 11.4 | 9.318 |
| 2 | 6 59 4.81 | 2.4779 | 27 45 19.6 | 2.971 | 2 | 8 51 19.44 | 2.1785 | 22 35 49.2 | 9.421 |
| 3 | 7 1 33.35 | 2.4734 | 27 42 16.4 | 3.134 | 3 | 8 53 29.95 | 2.1717 | 22 26 20.9 | 9.522 |
| 4 | 7 4 1.62 | 2.4688 | 27 39 3.4 | 3.296 | 4 | 8 55 40.04 | 2.1646 | 22 16 46.5 | 9.622 |
| 5 | 7 6 29.61 | 2.4641 | 27 35 40.8 | 3.457 | 5 | 8 57 49.70 | 2.1576 | 22 7 6.1 | 9.721 |
| 6 | 7 8 57.31 | 2.4593 | 27 32 8.6 | 3.617 | 6 | 8 59 58.94 | 2.1506 | 21 57 19.8 | 9.818 |
| 7 | 7 11 24.72 | 2.4544 | 27 28 26.8 | 3.776 | 7 | 9 2 7.77 | 2.1436 | 21 47 27.8 | 9.914 |
| 8 | 7 13 51.84 | 2.4493 | 27 24 35.5 | 3.934 | 8 | 9 4 16.18 | 2.1367 | 21 37 30.1 | 10.008 |
| 9 | 7 16 18.65 | 2.4442 | 27 20 34.8 | 4.091 | 9 | 9 6 24.18 | 2.1299 | 21 27 26.8 | 10.101 |
| 10 | 7 18 45.15 | 2.4390 | 27 16 24.6 | 4.247 | 10 | 9 8 31.77 | 2.1231 | 21 17 17.9 | 10.193 |
| 11 | 7 21 11.33 | 2.4336 | 27 12 5.1 | 4.402 | 11 | 9 10 38.95 | 2.1163 | 21 7 3.6 | 10.283 |
| 12 | 7 23 37.18 | 2.4282 | 27 7 36.4 | 4.555 | 12 | 9 12 45.72 | 2.1094 | 20 56 43.9 | 10.373 |
| 13 | 7 26 2.71 | 2.4227 | 27 2 58.5 | 4.707 | 13 | 9 14 52.08 | 2.1026 | 20 46 18.9 | 10.461 |
| 14 | 7 28 27.91 | 2.4171 | 26 58 11.5 | 4.858 | 14 | 9 16 58.04 | 2.0959 | 20 35 48.6 | 10.548 |
| 15 | 7 30 52.77 | 2.4114 | 26 53 15.5 | 5.008 | 15 | 9 19 3.60 | 2.0893 | 20 25 13.2 | 10.632 |
| 16 | 7 33 17.28 | 2.4056 | 26 48 10.5 | 5.157 | 16 | 9 21 8.76 | 2.0826 | 20 14 32.8 | 10.715 |
| 17 | 7 35 41.44 | 2.3997 | 26 42 56.6 | 5.305 | 17 | 9 23 13.52 | 2.0760 | 20 3 47.4 | 10.797 |
| 18 | 7 38 5.24 | 2.3937 | 26 37 33.9 | 5.451 | 18 | 9 25 17.88 | 2.0694 | 19 52 57.1 | 10.878 |
| 19 | 7 40 28.68 | 2.3877 | 26 32 2.5 | 5.596 | 19 | 9 27 21.85 | 2.0629 | 19 42 2.0 | 10.956 |
| 20 | 7 42 51.76 | 2.3816 | 26 26 22.4 | 5.740 | 20 | 9 29 25.43 | 2.0564 | 19 31 2.1 | 11.037 |
| 21 | 7 45 14.47 | 2.3753 | 26 20 33.7 | 5.882 | 21 | 9 31 28.62 | 2.0499 | 19 19 57.5 | 11.115 |
| 22 | 7 47 36.80 | 2.3690 | 26 14 36.5 | 6.022 | 22 | 9 33 31.42 | 2.0435 | 19 8 48.3 | 11.191 |
| 23 | 7 49 58.75 | 2.3627 | 26 8 30.9 | 6.162 | 23 | 9 35 33.84 | 2.0372 | 18 57 34.6 | 11.265 |
| 24 | 7 52 20.32 | 2.3563 | N.26 2 17.0 | 6.301 | 24 | 9 37 35.88 | 2.0308 | N.18 46 16.5 | 11.338 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SATURDAY 5. | | | | | MONDAY 7. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 37 35.88 | 2.0306 | N.18 46 16.5 | 11.338 | 0 | 11 8 55.71 | 1.8007 | N. 8 38 33.0 | 13.599 |
| 1 | 9 39 37.54 | 2.0245 | 18 34 54.0 | 11.410 | 1 | 11 10 43.66 | 1.7977 | 8 24 56.3 | 13.623 |
| 2 | 9 41 38.82 | 2.0183 | 18 23 27.2 | 11.482 | 2 | 11 12 31.43 | 1.7947 | 8 11 18.2 | 13.647 |
| 3 | 9 43 39.73 | 2.0121 | 18 11 56.1 | 11.552 | 3 | 11 14 19.02 | 1.7917 | 7 57 38.7 | 13.670 |
| 4 | 9 45 40.27 | 2.0060 | 18 0 20.9 | 11.620 | 4 | 11 16 6.44 | 1.7888 | 7 43 57.8 | 13.692 |
| 5 | 9 47 40.45 | 2.0000 | 17 48 41.7 | 11.687 | 5 | 11 17 53.69 | 1.7862 | 7 30 15.5 | 13.714 |
| 6 | 9 49 40.27 | 1.9940 | 17 36 58.5 | 11.754 | 6 | 11 19 40.78 | 1.7836 | 7 16 32.0 | 13.734 |
| 7 | 9 51 39.73 | 1.9881 | 17 25 11.2 | 11.820 | 7 | 11 21 27.71 | 1.7809 | 7 2 47.4 | 13.754 |
| 8 | 9 53 38.84 | 1.9822 | 17 13 20.0 | 11.882 | 8 | 11 23 14.49 | 1.7784 | 6 49 1.6 | 13.773 |
| 9 | 9 56 37.59 | 1.9763 | 17 1 25.1 | 11.946 | 9 | 11 25 1.12 | 1.7760 | 6 35 14.6 | 13.792 |
| 10 | 9 57 35.99 | 1.9705 | 16 49 26.5 | 12.007 | 10 | 11 26 47.61 | 1.7737 | 6 21 26.5 | 13.810 |
| 11 | 9 59 34.05 | 1.9648 | 16 37 24.2 | 12.068 | 11 | 11 28 33.96 | 1.7714 | 6 7 37.4 | 13.827 |
| 12 | 10 1 31.77 | 1.9592 | 16 25 18.3 | 12.128 | 12 | 11 30 20.17 | 1.7692 | 5 53 47.3 | 13.843 |
| 13 | 10 3 29.15 | 1.9536 | 16 13 8.9 | 12.186 | 13 | 11 32 6.25 | 1.7670 | 5 39 56.3 | 13.858 |
| 14 | 10 5 26.20 | 1.9481 | 16 0 56.0 | 12.243 | 14 | 11 33 52.21 | 1.7650 | 5 26 4.4 | 13.872 |
| 15 | 10 7 22.92 | 1.9426 | 15 48 39.7 | 12.299 | 15 | 11 35 38.05 | 1.7630 | 5 12 11.7 | 13.885 |
| 16 | 10 9 19.31 | 1.9371 | 15 36 20.1 | 12.354 | 16 | 11 37 23.77 | 1.7611 | 4 58 18.2 | 13.898 |
| 17 | 10 11 15.37 | 1.9316 | 15 23 57.2 | 12.408 | 17 | 11 39 9.38 | 1.7593 | 4 44 23.9 | 13.911 |
| 18 | 10 13 11.10 | 1.9263 | 15 11 31.1 | 12.461 | 18 | 11 40 54.89 | 1.7576 | 4 30 28.8 | 13.923 |
| 19 | 10 15 6.52 | 1.9212 | 14 59 1.9 | 12.512 | 19 | 11 42 40.30 | 1.7560 | 4 16 33.0 | 13.935 |
| 20 | 10 17 1.64 | 1.9162 | 14 46 29.6 | 12.562 | 20 | 11 44 25.61 | 1.7544 | 4 2 36.5 | 13.946 |
| 21 | 10 18 56.46 | 1.9111 | 14 33 54.3 | 12.612 | 21 | 11 46 10.82 | 1.7528 | 3 48 39.5 | 13.955 |
| 22 | 10 20 50.97 | 1.9061 | 14 21 16.1 | 12.661 | 22 | 11 47 55.95 | 1.7514 | 3 34 41.9 | 13.964 |
| 23 | 10 22 45.18 | 1.9011 | N.14 8 35.0 | 12.709 | 23 | 11 49 41.00 | 1.7501 | N. 3 20 43.8 | 13.972 |
| | SUNDAY 6. | | | | | TUESDAY 8. | | | |
| 0 | 10 24 39.10 | 1.8962 | N.13 55 51.0 | 12.756 | 0 | 11 51 25.96 | 1.7488 | N. 3 6 45.2 | 13.980 |
| 1 | 10 26 32.73 | 1.8914 | 13 43 4.2 | 12.802 | 1 | 11 53 10.86 | 1.7477 | 2 52 46.2 | 13.987 |
| 2 | 10 28 26.07 | 1.8867 | 13 30 14.7 | 12.847 | 2 | 11 54 55.68 | 1.7467 | 2 38 46.8 | 13.993 |
| 3 | 10 30 19.13 | 1.8821 | 13 17 22.5 | 12.891 | 3 | 11 56 40.45 | 1.7457 | 2 24 47.0 | 13.999 |
| 4 | 10 32 11.91 | 1.8775 | 13 4 27.7 | 12.934 | 4 | 11 58 25.16 | 1.7447 | 2 10 46.9 | 14.004 |
| 5 | 10 34 4.42 | 1.8729 | 12 51 30.4 | 12.975 | 5 | 12 0 9.81 | 1.7438 | 1 56 46.5 | 14.009 |
| 6 | 10 35 56.66 | 1.8684 | 12 38 30.7 | 13.015 | 6 | 12 1 54.41 | 1.7430 | 1 42 45.8 | 14.013 |
| 7 | 10 37 48.63 | 1.8640 | 12 25 28.6 | 13.055 | 7 | 12 3 38.97 | 1.7423 | 1 28 44.9 | 14.017 |
| 8 | 10 39 40.34 | 1.8597 | 12 12 24.1 | 13.096 | 8 | 12 5 23.49 | 1.7416 | 1 14 43.8 | 14.019 |
| 9 | 10 41 31.79 | 1.8554 | 11 59 17.2 | 13.134 | 9 | 12 7 7.96 | 1.7410 | 1 0 42.6 | 14.021 |
| 10 | 10 43 22.99 | 1.8512 | 11 46 8.0 | 13.171 | 10 | 12 8 52.40 | 1.7405 | 0 46 41.3 | 14.022 |
| 11 | 10 45 13.94 | 1.8471 | 11 32 56.7 | 13.207 | 11 | 12 10 36.82 | 1.7401 | 0 32 39.9 | 14.023 |
| 12 | 10 47 4.64 | 1.8431 | 11 19 43.2 | 13.243 | 12 | 12 12 21.22 | 1.7398 | 0 18 38.5 | 14.023 |
| 13 | 10 48 55.10 | 1.8391 | 11 6 27.6 | 13.277 | 13 | 12 14 5.60 | 1.7396 | N. 0 4 37.1 | 14.023 |
| 14 | 10 50 45.33 | 1.8352 | 10 53 10.0 | 13.310 | 14 | 12 15 49.97 | 1.7395 | S. 0 9 24.2 | 14.022 |
| 15 | 10 52 35.33 | 1.8314 | 10 39 50.4 | 13.342 | 15 | 12 17 34.34 | 1.7395 | 0 23 25.5 | 14.020 |
| 16 | 10 54 25.10 | 1.8277 | 10 26 28.9 | 13.374 | 16 | 12 19 18.71 | 1.7396 | 0 37 26.6 | 14.017 |
| 17 | 10 56 14.65 | 1.8241 | 10 13 5.5 | 13.405 | 17 | 12 21 3.07 | 1.7396 | 0 51 27.5 | 14.013 |
| 18 | 10 58 3.99 | 1.8206 | 9 59 40.3 | 13.435 | 18 | 12 22 47.44 | 1.7396 | 1 5 28.2 | 14.009 |
| 19 | 10 59 53.12 | 1.8171 | 9 46 13.3 | 13.465 | 19 | 12 24 31.82 | 1.7398 | 1 19 28.6 | 14.004 |
| 20 | 11 1 42.04 | 1.8136 | 9 32 44.5 | 13.494 | 20 | 12 26 16.22 | 1.7402 | 1 33 28.7 | 13.999 |
| 21 | 11 3 30.75 | 1.8102 | 9 19 14.0 | 13.522 | 21 | 12 28 0.64 | 1.7406 | 1 47 28.5 | 13.993 |
| 22 | 11 5 19.26 | 1.8069 | 9 5 41.9 | 13.548 | 22 | 12 29 45.09 | 1.7411 | 2 1 28.0 | 13.987 |
| 23 | 11 7 7.58 | 1.8037 | 8 52 8.2 | 13.574 | 23 | 12 31 29.57 | 1.7416 | 2 15 27.0 | 13.980 |
| 24 | 11 8 55.71 | 1.8007 | N. 8 38 33.0 | 13.599 | 24 | 12 33 14.08 | 1.7422 | S. 2 29 25.6 | 13.972 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | WEDNESDAY 9. | | | | | FRIDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 33 14.08 | 1.7422 | S. 2 29 25.6 | 13.972 | 0 | 13 59 5.00 | 1.8649 | S.13 18 15.7 | 12.784 |
| 1 | 12 34 58.63 | 1.7429 | 2 43 23.7 | 13.963 | 1 | 14 0 57.03 | 1.8694 | 13 31 1.4 | 12.740 |
| 2 | 12 36 43.23 | 1.7437 | 2 57 21.2 | 13.954 | 2 | 14 2 49.33 | 1.8739 | 13 43 44.5 | 12.696 |
| 3 | 12 38 27.88 | 1.7446 | 3 11 18.2 | 13.945 | 3 | 14 4 41.90 | 1.8785 | 13 56 24.9 | 12.650 |
| 4 | 12 40 12.58 | 1.7456 | 3 25 14.6 | 13.934 | 4 | 14 6 34.75 | 1.8832 | 14 9 2.5 | 12.603 |
| 5 | 12 41 57.34 | 1.7466 | 3 39 10.3 | 13.922 | 5 | 14 8 27.88 | 1.8879 | 14 21 37.3 | 12.556 |
| 6 | 12 43 42.16 | 1.7476 | 3 53 5.3 | 13.910 | 6 | 14 10 21.30 | 1.8927 | 14 34 9.2 | 12.507 |
| 7 | 12 45 27.05 | 1.7487 | 4 6 59.6 | 13.898 | 7 | 14 12 15.01 | 1.8977 | 14 46 38.2 | 12.458 |
| 8 | 12 47 12.01 | 1.7500 | 4 20 53.1 | 13.885 | 8 | 14 14 9.02 | 1.9027 | 14 59 4.2 | 12.408 |
| 9 | 12 48 57.05 | 1.7514 | 4 34 45.8 | 13.872 | 9 | 14 16 3.33 | 1.9078 | 15 11 27.2 | 12.357 |
| 10 | 12 50 42.18 | 1.7529 | 4 48 37.7 | 13.858 | 10 | 14 17 57.95 | 1.9129 | 15 23 47.1 | 12.305 |
| 11 | 12 52 27.40 | 1.7544 | 5 2 28.7 | 13.843 | 11 | 14 19 52.88 | 1.9181 | 15 36 3.9 | 12.253 |
| 12 | 12 54 12.71 | 1.7559 | 5 16 18.8 | 13.827 | 12 | 14 21 48.12 | 1.9232 | 15 48 17.5 | 12.199 |
| 13 | 12 55 58.11 | 1.7575 | 5 30 7.9 | 13.810 | 13 | 14 23 43.67 | 1.9285 | 16 0 27.8 | 12.143 |
| 14 | 12 57 43.61 | 1.7592 | 5 43 56.0 | 13.793 | 14 | 14 25 39.54 | 1.9338 | 16 12 34.7 | 12.087 |
| 15 | 12 59 29.22 | 1.7611 | 5 57 43.1 | 13.776 | 15 | 14 27 35.73 | 1.9392 | 16 24 38.2 | 12.029 |
| 16 | 13 1 14.94 | 1.7630 | 6 11 29.2 | 13.757 | 16 | 14 29 32.25 | 1.9448 | 16 36 38.2 | 11.971 |
| 17 | 13 3 0.78 | 1.7650 | 6 25 14.1 | 13.738 | 17 | 14 31 29.11 | 1.9505 | 16 48 34.7 | 11.912 |
| 18 | 13 4 46.74 | 1.7671 | 6 38 57.8 | 13.718 | 18 | 14 33 26.31 | 1.9562 | 17 0 27.7 | 11.853 |
| 19 | 13 6 32.83 | 1.7692 | 6 52 40.3 | 13.698 | 19 | 14 35 23.85 | 1.9619 | 17 12 17.1 | 11.792 |
| 20 | 13 8 19.05 | 1.7714 | 7 6 21.6 | 13.677 | 20 | 14 37 21.74 | 1.9677 | 17 24 2.7 | 11.729 |
| 21 | 13 10 5.40 | 1.7737 | 7 20 1.6 | 13.656 | 21 | 14 39 19.98 | 1.9735 | 17 35 44.5 | 11.666 |
| 22 | 13 11 51.89 | 1.7760 | 7 33 40.3 | 13.634 | 22 | 14 41 18.57 | 1.9794 | 17 47 22.5 | 11.601 |
| 23 | 13 13 38.52 | 1.7784 | S. 7 47 17.7 | 13.612 | 23 | 14 43 17.51 | 1.9853 | .S17 58 56.6 | 11.535 |
| | THURSDAY 10. | | | | | SATURDAY 12. | | | |
| 0 | 13 15 25.30 | 1.7809 | S. 8 0 53.7 | 13.588 | 0 | 14 45 16.81 | 1.9912 | S.18 10 26.7 | 11.468 |
| 1 | 13 17 12.23 | 1.7835 | 8 14 28.2 | 13.563 | 1 | 14 47 16.47 | 1.9974 | 18 21 52.8 | 11.401 |
| 2 | 13 18 59.32 | 1.7863 | 8 28 1.2 | 13.537 | 2 | 14 49 16.50 | 2.0036 | 18 33 14.8 | 11.332 |
| 3 | 13 20 46.58 | 1.7891 | 8 41 32.6 | 13.510 | 3 | 14 51 16.90 | 2.0098 | 18 44 32.6 | 11.262 |
| 4 | 13 22 34.01 | 1.7919 | 8 55 2.4 | 13.483 | 4 | 14 53 17.68 | 2.0161 | 18 55 46.2 | 11.191 |
| 5 | 13 24 21.61 | 1.7948 | 9 8 30.6 | 13.456 | 5 | 14 55 18.84 | 2.0224 | 19 6 55.5 | 11.118 |
| 6 | 13 26 9.38 | 1.7977 | 9 21 57.1 | 13.428 | 6 | 14 57 20.38 | 2.0288 | 19 18 0.4 | 11.044 |
| 7 | 13 27 57.33 | 1.8007 | 9 35 21.9 | 13.398 | 7 | 14 59 22.30 | 2.0352 | 19 29 0.8 | 10.969 |
| 8 | 13 29 45.47 | 1.8039 | 9 48 44.9 | 13.368 | 8 | 15 1 24.61 | 2.0417 | 19 39 56.7 | 10.893 |
| 9 | 13 31 33.80 | 1.8072 | 10 2 6.1 | 13.338 | 9 | 15 3 27.31 | 2.0483 | 19 50 48.0 | 10.816 |
| 10 | 13 33 22.33 | 1.8106 | 10 15 25.5 | 13.307 | 10 | 15 5 30.41 | 2.0550 | 20 1 34.7 | 10.738 |
| 11 | 13 35 11.07 | 1.8141 | 10 28 43.1 | 13.275 | 11 | 15 7 33.91 | 2.0617 | 20 12 16.6 | 10.658 |
| 12 | 13 37 0.02 | 1.8176 | 10 41 58.7 | 13.243 | 12 | 15 9 37.81 | 2.0683 | 20 22 53.6 | 10.577 |
| 13 | 13 38 49.18 | 1.8211 | 10 55 12.3 | 13.209 | 13 | 15 11 42.11 | 2.0750 | 20 33 25.7 | 10.494 |
| 14 | 13 40 38.55 | 1.8246 | 11 8 23.8 | 13.174 | 14 | 15 13 46.81 | 2.0817 | 20 43 52.9 | 10.411 |
| 15 | 13 42 28.13 | 1.8282 | 11 21 33.2 | 13.139 | 15 | 15 15 51.92 | 2.0885 | 20 54 15.1 | 10.326 |
| 16 | 13 44 17.93 | 1.8319 | 11 34 40.5 | 13.102 | 16 | 15 17 57.44 | 2.0954 | 21 4 32.1 | 10.240 |
| 17 | 13 46 7.96 | 1.8358 | 11 47 45.6 | 13.065 | 17 | 15 20 3.37 | 2.1023 | 21 14 43.9 | 10.152 |
| 18 | 13 47 58.23 | 1.8398 | 12 0 48.4 | 13.028 | 18 | 15 22 9.72 | 2.1093 | 21 24 50.4 | 10.064 |
| 19 | 13 49 48.74 | 1.8438 | 12 13 49.0 | 12.990 | 19 | 15 24 16.49 | 2.1163 | 21 34 51.6 | 9.975 |
| 20 | 13 51 39.49 | 1.8479 | 12 26 47.2 | 12.951 | 20 | 15 26 23.68 | 2.1233 | 21 44 47.4 | 9.884 |
| 21 | 13 53 30.49 | 1.8521 | 12 39 43.1 | 12.911 | 21 | 15 28 31.29 | 2.1303 | 21 54 37.7 | 9.791 |
| 22 | 13 55 21.74 | 1.8563 | 12 52 36.5 | 12.869 | 22 | 15 30 39.32 | 2.1374 | 22 4 22.4 | 9.697 |
| 23 | 13 57 13.24 | 1.8605 | 13 5 27.4 | 12.827 | 23 | 15 32 47.78 | 2.1445 | 22 14 1.4 | 9.602 |
| 24 | 13 59 5.00 | 1.8649 | S.13 18 15.7 | 12.784 | 24 | 15 34 56.66 | 2.1516 | S.22 23 34.7 | 9.506 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 34 56.66 | 2.1516 | S.22 23 34.7 | 9.506 |
| 1 | 15 37 5.97 | 2.1586 | 22 33 2.2 | 9.409 |
| 2 | 15 39 15.71 | 2.1656 | 22 42 23.8 | 9.310 |
| 3 | 15 41 25.87 | 2.1730 | 22 51 39.4 | 9.209 |
| 4 | 15 43 36.47 | 2.1803 | 23 0 48.9 | 9.107 |
| 5 | 15 45 47.51 | 2.1876 | 23 9 52.3 | 9.004 |
| 6 | 15 47 58.98 | 2.1949 | 23 18 49.4 | 8.899 |
| 7 | 15 50 10.89 | 2.2022 | 23 27 40.2 | 8.793 |
| 8 | 15 52 23.24 | 2.2095 | 23 36 24.6 | 8.686 |
| 9 | 15 54 36.03 | 2.2168 | 23 45 2.5 | 8.577 |
| 10 | 15 56 49.26 | 2.2242 | 23 53 33.9 | 8.467 |
| 11 | 15 59 2.93 | 2.2315 | 24 1 58.6 | 8.356 |
| 12 | 16 1 17.04 | 2.2388 | 24 10 16.6 | 8.243 |
| 13 | 16 3 31.59 | 2.2461 | 24 18 27.8 | 8.129 |
| 14 | 16 5 46.58 | 2.2535 | 24 26 32.1 | 8.013 |
| 15 | 16 8 2.01 | 2.2609 | 24 34 29.4 | 7.896 |
| 16 | 16 10 17.88 | 2.2683 | 24 42 19.6 | 7.777 |
| 17 | 16 12 34.20 | 2.2757 | 24 50 2.6 | 7.657 |
| 18 | 16 14 50.96 | 2.2829 | 24 57 38.4 | 7.536 |
| 19 | 16 17 8.15 | 2.2900 | 25 5 6.9 | 7.413 |
| 20 | 16 19 25.76 | 2.2970 | 25 12 27.9 | 7.288 |
| 21 | 16 21 43.79 | 2.3041 | 25 19 41.4 | 7.162 |
| 22 | 16 24 2.25 | 2.3112 | 25 26 47.3 | 7.034 |
| 23 | 16 26 21.14 | 2.3184 | S.25 33 45.5 | 6.906 |

### MONDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 16 28 40.46 | 2.3255 | S.25 40 36.0 | 6.777 |
| 1 | 16 31 0.20 | 2.3325 | 25 47 18.7 | 6.646 |
| 2 | 16 33 20.36 | 2.3394 | 25 53 53.5 | 6.512 |
| 3 | 16 35 40.93 | 2.3463 | 26 0 20.1 | 6.377 |
| 4 | 16 38 1.91 | 2.3532 | 26 6 38.7 | 6.241 |
| 5 | 16 40 23.31 | 2.3601 | 26 12 49.1 | 6.104 |
| 6 | 16 42 45.12 | 2.3669 | 26 18 51.2 | 5.966 |
| 7 | 16 45 7.34 | 2.3737 | 26 24 45.0 | 5.826 |
| 8 | 16 47 29.97 | 2.3805 | 26 30 30.3 | 5.684 |
| 9 | 16 49 53.00 | 2.3872 | 26 36 7.1 | 5.541 |
| 10 | 16 52 16.43 | 2.3938 | 26 41 35.3 | 5.397 |
| 11 | 16 54 40.25 | 2.4003 | 26 46 54.8 | 5.252 |
| 12 | 16 57 4.46 | 2.4068 | 26 52 5.6 | 5.106 |
| 13 | 16 59 29.06 | 2.4132 | 26 57 7.6 | 4.959 |
| 14 | 17 1 54.05 | 2.4196 | 27 2 0.7 | 4.810 |
| 15 | 17 4 19.42 | 2.4260 | 27 6 44.8 | 4.659 |
| 16 | 17 6 45.17 | 2.4322 | 27 11 19.8 | 4.507 |
| 17 | 17 9 11.29 | 2.4384 | 27 15 45.6 | 4.354 |
| 18 | 17 11 37.78 | 2.4445 | 27 20 2.3 | 4.200 |
| 19 | 17 14 4.63 | 2.4504 | 27 24 9.7 | 4.044 |
| 20 | 17 16 31.83 | 2.4562 | 27 28 7.7 | 3.887 |
| 21 | 17 18 59.37 | 2.4618 | 27 31 56.2 | 3.729 |
| 22 | 17 21 27.25 | 2.4674 | 27 35 35.2 | 3.570 |
| 23 | 17 23 55.47 | 2.4730 | 27 39 4.6 | 3.409 |
| 24 | 17 26 24.02 | 2.4784 | S.27 42 24.3 | 3.248 |

### TUESDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 26 24.02 | 2.4784 | S.27 42 24.3 | 3.248 |
| 1 | 17 28 52.89 | 2.4837 | 27 45 34.3 | 3.086 |
| 2 | 17 31 22.07 | 2.4888 | 27 48 34.6 | 2.923 |
| 3 | 17 33 51.55 | 2.4938 | 27 51 25.1 | 2.758 |
| 4 | 17 36 21.33 | 2.4987 | 27 54 5.6 | 2.592 |
| 5 | 17 38 51.40 | 2.5035 | 27 56 36.1 | 2.425 |
| 6 | 17 41 21.76 | 2.5082 | 27 58 56.5 | 2.257 |
| 7 | 17 43 52.40 | 2.5129 | 28 1 6.9 | 2.088 |
| 8 | 17 46 23.31 | 2.5174 | 28 3 7.1 | 1.918 |
| 9 | 17 48 54.49 | 2.5217 | 28 4 57.1 | 1.747 |
| 10 | 17 51 25.92 | 2.5259 | 28 6 36.8 | 1.575 |
| 11 | 17 53 57.60 | 2.5300 | 28 8 6.1 | 1.402 |
| 12 | 17 56 29.52 | 2.5339 | 28 9 25.0 | 1.229 |
| 13 | 17 59 1.67 | 2.5377 | 28 10 33.5 | 1.056 |
| 14 | 18 1 34.04 | 2.5413 | 28 11 31.6 | 0.881 |
| 15 | 18 4 6.63 | 2.5449 | 28 12 19.2 | 0.705 |
| 16 | 18 6 39.43 | 2.5483 | 28 12 56.2 | 0.528 |
| 17 | 18 9 12.43 | 2.5516 | 28 13 22.6 | 0.351 |
| 18 | 18 11 45.62 | 2.5547 | 28 13 38.3 | 0.172 |
| 19 | 18 14 18.99 | 2.5576 | 28 13 43.3 | 0.006 |
| 20 | 18 16 52.53 | 2.5603 | 28 13 37.6 | 0.185 |
| 21 | 18 19 26.23 | 2.5629 | 28 13 21.1 | 0.365 |
| 22 | 18 22 0.08 | 2.5654 | 28 12 53.8 | 0.545 |
| 23 | 18 24 34.08 | 2.5678 | S.28 12 15.7 | 0.726 |

### WEDNESDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 18 27 8.22 | 2.5701 | S.28 11 26.7 | 0.907 |
| 1 | 18 29 42.49 | 2.5722 | 28 10 26.8 | 1.089 |
| 2 | 18 32 16.88 | 2.5740 | 28 9 16.0 | 1.271 |
| 3 | 18 34 51.37 | 2.5756 | 28 7 54.3 | 1.453 |
| 4 | 18 37 25.95 | 2.5770 | 28 6 21.7 | 1.635 |
| 5 | 18 40 0.61 | 2.5783 | 28 4 38.2 | 1.817 |
| 6 | 18 42 35.35 | 2.5795 | 28 2 43.7 | 2.000 |
| 7 | 18 45 10.15 | 2.5806 | 28 0 38.2 | 2.184 |
| 8 | 18 47 45.01 | 2.5814 | 27 58 21.6 | 2.368 |
| 9 | 18 50 19.92 | 2.5821 | 27 55 54.0 | 2.552 |
| 10 | 18 52 54.86 | 2.5826 | 27 53 15.4 | 2.736 |
| 11 | 18 55 29.83 | 2.5830 | 27 50 25.8 | 2.919 |
| 12 | 18 58 4.82 | 2.5832 | 27 47 25.1 | 3.103 |
| 13 | 19 0 39.82 | 2.5833 | 27 44 13.4 | 3.287 |
| 14 | 19 3 14.82 | 2.5832 | 27 40 50.7 | 3.470 |
| 15 | 19 5 49.81 | 2.5830 | 27 37 17.0 | 3.653 |
| 16 | 19 8 24.78 | 2.5826 | 27 33 32.3 | 3.837 |
| 17 | 19 10 59.72 | 2.5821 | 27 29 36.6 | 4.020 |
| 18 | 19 13 34.63 | 2.5814 | 27 25 29.9 | 4.202 |
| 19 | 19 16 9.49 | 2.5806 | 27 21 12.2 | 4.386 |
| 20 | 19 18 44.29 | 2.5795 | 27 16 43.6 | 4.568 |
| 21 | 19 21 19.03 | 2.5783 | 27 12 4.1 | 4.749 |
| 22 | 19 23 53.69 | 2.5770 | 27 7 13.7 | 4.931 |
| 23 | 19 26 28.27 | 2.5756 | 27 2 12.4 | 5.112 |
| 24 | 19 29 2.77 | 2.5741 | S.26 57 0.2 | 5.293 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | THURSDAY 17. | | | | | SATURDAY 19. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 19 29 2.77 | 2.5741 | S.26 57 0.2 | 5.298 | 0 | 21 28 36.33 | 2.3780 | S.19 31 37.8 | 12.786 |
| 1 | 19 31 37.17 | 2.5724 | 26 51 37.2 | 5.478 | 1 | 21 30 58.85 | 2.3727 | 19 18 47.0 | 12.907 |
| 2 | 19 34 11.46 | 2.5706 | 26 46 3.4 | 5.658 | 2 | 21 33 21.05 | 2.3673 | 19 5 48.9 | 13.027 |
| 3 | 19 36 45.63 | 2.5684 | 26 40 18.8 | 5.832 | 3 | 21 35 42.93 | 2.3620 | 18 52 43.7 | 13.146 |
| 4 | 19 39 19.67 | 2.5662 | 26 34 23.5 | 6.011 | 4 | 21 38 4.49 | 2.3567 | 18 39 31.4 | 13.263 |
| 5 | 19 41 53.58 | 2.5639 | 26 28 17.5 | 6.189 | 5 | 21 40 25.73 | 2.3514 | 18 26 12.2 | 13.377 |
| 6 | 19 44 27.36 | 2.5616 | 26 22 0.8 | 6.366 | 6 | 21 42 46.65 | 2.3461 | 18 12 46.2 | 13.489 |
| 7 | 19 47 0.99 | 2.5591 | 26 15 33.5 | 6.542 | 7 | 21 45 7.26 | 2.3409 | 17 59 13.5 | 13.600 |
| 8 | 19 49 34.46 | 2.5564 | 26 8 55.7 | 6.717 | 8 | 21 47 27.56 | 2.3356 | 17 45 34.2 | 13.709 |
| 9 | 19 52 7.76 | 2.5536 | 26 2 7.4 | 6.892 | 9 | 21 49 47.54 | 2.3303 | 17 31 48.4 | 13.817 |
| 10 | 19 54 40.89 | 2.5507 | 25 55 8.6 | 7.067 | 10 | 21 52 7.20 | 2.325 | 17 17 56.2 | 13.923 |
| 11 | 19 57 13.84 | 2.5476 | 25 47 59.3 | 7.241 | 11 | 21 54 26.54 | 2.3198 | 17 3 57.7 | 14.027 |
| 12 | 19 59 46.60 | 2.5444 | 25 40 39.6 | 7.414 | 12 | 21 56 45.57 | 2.3146 | 16 49 53.0 | 14.129 |
| 13 | 20 2 19.16 | 2.5411 | 25 33 9.6 | 7.585 | 13 | 21 59 4.29 | 2.3094 | 16 35 42.2 | 14.230 |
| 14 | 20 4 51.52 | 2.5377 | 25 25 29.4 | 7.754 | 14 | 22 1 22.70 | 2.3046 | 16 21 25.5 | 14.328 |
| 15 | 20 7 23.68 | 2.5342 | 25 17 39.1 | 7.923 | 15 | 22 3 40.81 | 2.2993 | 16 7 3.0 | 14.424 |
| 16 | 20 9 55.63 | 2.5306 | 25 9 38.7 | 8.092 | 16 | 22 5 58.62 | 2.2943 | 15 52 34.7 | 14.519 |
| 17 | 20 12 27.36 | 2.5269 | 25 1 28.2 | 8.259 | 17 | 22 8 16.13 | 2.2894 | 15 38 0.7 | 14.613 |
| 18 | 20 14 58.86 | 2.5230 | 24 53 7.6 | 8.426 | 18 | 22 10 33.35 | 2.2845 | 15 23 21.2 | 14.705 |
| 19 | 20 17 30.12 | 2.5190 | 24 44 37.0 | 8.591 | 19 | 22 12 50.27 | 2.2796 | 15 8 36.3 | 14.794 |
| 20 | 20 20 1.14 | 2.5150 | 24 35 56.6 | 8.756 | 20 | 22 15 6.89 | 2.2746 | 14 53 46.1 | 14.881 |
| 21 | 20 22 31.92 | 2.5109 | 24 27 6.4 | 8.918 | 21 | 22 17 23.21 | 2.2696 | 14 38 50.6 | 14.968 |
| 22 | 20 25 2.45 | 2.5068 | 24 18 6.4 | 9.080 | 22 | 22 19 39.24 | 2.2648 | 14 23 49.9 | 15.053 |
| 23 | 20 27 32.73 | 2.5026 | S.24 8 56.8 | 9.240 | 23 | 22 21 54.98 | 2.2600 | S.14 8 44.2 | 15.135 |
| | FRIDAY 18. | | | | | SUNDAY 20. | | | |
| 0 | 20 30 2.76 | 2.4983 | S.23 59 37.6 | 9.399 | 0 | 22 24 10.43 | 2.2552 | S.13 53 33.7 | 15.214 |
| 1 | 20 32 32.53 | 2.4939 | 23 50 8.9 | 9.557 | 1 | 22 26 25.60 | 2.2506 | 13 38 18.5 | 15.292 |
| 2 | 20 35 2.03 | 2.4893 | 23 40 30.8 | 9.718 | 2 | 22 28 40.50 | 2.2461 | 13 22 58.6 | 15.369 |
| 3 | 20 37 31.25 | 2.4847 | 23 30 43.3 | 9.869 | 3 | 22 30 55.13 | 2.2416 | 13 7 34.1 | 15.446 |
| 4 | 20 40 0.19 | 2.4800 | 23 20 46.5 | 10.023 | 4 | 22 33 9.49 | 2.2372 | 12 52 5.1 | 15.520 |
| 5 | 20 42 28.85 | 2.4752 | 23 10 40.5 | 10.176 | 5 | 22 35 23.59 | 2.2329 | 12 36 31.7 | 15.592 |
| 6 | 20 44 57.22 | 2.4705 | 23 0 25.4 | 10.327 | 6 | 22 37 37.44 | 2.2286 | 12 20 54.0 | 15.662 |
| 7 | 20 47 25.31 | 2.4657 | 22 50 1.3 | 10.476 | 7 | 22 39 51.03 | 2.2244 | 12 5 12.2 | 15.730 |
| 8 | 20 49 53.11 | 2.4609 | 22 39 28.3 | 10.624 | 8 | 22 42 4.37 | 2.2202 | 11 49 26.4 | 15.797 |
| 9 | 20 52 20.62 | 2.4560 | 22 28 46.4 | 10.771 | 9 | 22 44 17.46 | 2.2161 | 11 33 36.7 | 15.861 |
| 10 | 20 54 47.83 | 2.4510 | 22 17 55.7 | 10.916 | 10 | 22 46 30.30 | 2.2120 | 11 17 43.1 | 15.924 |
| 11 | 20 57 14.74 | 2.4459 | 22 6 56.4 | 11.060 | 11 | 22 48 42.90 | 2.2081 | 11 1 45.8 | 15.986 |
| 12 | 20 59 41.34 | 2.4408 | 21 55 48.5 | 11.202 | 12 | 22 50 55.27 | 2.2042 | 10 45 44.8 | 16.046 |
| 13 | 21 2 7.64 | 2.4357 | 21 44 32.1 | 11.343 | 13 | 22 53 7.40 | 2.2003 | 10 29 40.3 | 16.103 |
| 14 | 21 4 33.63 | 2.4306 | 21 33 7.3 | 11.483 | 14 | 22 55 19.30 | 2.1964 | 10 13 32.4 | 16.159 |
| 15 | 21 6 59.31 | 2.4254 | 21 21 34.2 | 11.621 | 15 | 22 57 30.97 | 2.1926 | 9 57 21.2 | 16.214 |
| 16 | 21 9 24.68 | 2.4202 | 21 9 52.8 | 11.757 | 16 | 22 59 42.41 | 2.1888 | 9 41 6.7 | 16.267 |
| 17 | 21 11 49.74 | 2.4151 | 20 58 3.3 | 11.891 | 17 | 23 1 53.63 | 2.1852 | 9 24 49.1 | 16.318 |
| 18 | 21 14 14.49 | 2.4099 | 20 46 5.8 | 12.024 | 18 | 23 4 4.63 | 2.1816 | 9 8 28.5 | 16.367 |
| 19 | 21 16 38.93 | 2.4046 | 20 34 0.4 | 12.155 | 19 | 23 6 15.42 | 2.1781 | 8 52 5.1 | 16.413 |
| 20 | 21 19 3.05 | 2.3993 | 20 21 47.2 | 12.285 | 20 | 23 8 26.00 | 2.1747 | 8 35 38.9 | 16.459 |
| 21 | 21 21 26.85 | 2.3940 | 20 9 26.2 | 12.413 | 21 | 23 10 36.38 | 2.1714 | 8 19 10.0 | 16.503 |
| 22 | 21 23 50.33 | 2.3887 | 19 56 57.5 | 12.540 | 22 | 23 12 46.56 | 2.1682 | 8 2 38.5 | 16.545 |
| 23 | 21 26 13.49 | 2.3833 | 19 44 21.3 | 12.664 | 23 | 23 14 56.55 | 2.1650 | 7 46 4.6 | 16.585 |
| 24 | 21 28 36.33 | 2.3780 | S.19 31 37.8 | 12.786 | 24 | 23 17 6.36 | 2.1620 | S. 7 29 28.3 | 16.624 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 21. | | | | | WEDNESDAY 23. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 17 6.36 | 2.1620 | S. 7 29 28.3 | 16.624 | 0 | 0 58 59.19 | 2.1172 | N. 6 1 45.9 | 16.572 |
| 1 | 23 19 15.99 | 2.1590 | 7 12 49.7 | 16.661 | 1 | 1 1 6.26 | 2.1184 | 6 18 19.1 | 16.533 |
| 2 | 23 21 25.44 | 2.1561 | 6 56 9.0 | 16.696 | 2 | 1 3 13.40 | 2.1197 | 6 34 49.9 | 16.493 |
| 3 | 23 23 34.72 | 2.1532 | 6 39 26.2 | 16.729 | 3 | 1 5 20.62 | 2.1211 | 6 51 18.3 | 16.452 |
| 4 | 23 25 43.83 | 2.1504 | 6 22 41.5 | 16.760 | 4 | 1 7 27.93 | 2.1227 | 7 7 44.2 | 16.409 |
| 5 | 23 27 52.77 | 2.1477 | 6 5 55.0 | 16.790 | 5 | 1 9 35.34 | 2.1243 | 7 24 7.4 | 16.364 |
| 6 | 23 30 1.55 | 2.1452 | 5 49 6.7 | 16.819 | 6 | 1 11 42.85 | 2.1260 | 7 40 27.9 | 16.318 |
| 7 | 23 32 10.19 | 2.1428 | 5 32 16.7 | 16.845 | 7 | 1 13 50.46 | 2.1277 | 7 56 45.6 | 16.272 |
| 8 | 23 34 18.69 | 2.1406 | 5 15 25.2 | 16.871 | 8 | 1 15 58.17 | 2.1294 | 8 13 0.4 | 16.222 |
| 9 | 23 36 27.06 | 2.1382 | 4 58 32.3 | 16.894 | 9 | 1 18 5.99 | 2.1313 | 8 29 12.2 | 16.171 |
| 10 | 23 38 35.29 | 2.1360 | 4 41 38.0 | 16.916 | 10 | 1 20 13.93 | 2.1333 | 8 45 20.9 | 16.118 |
| 11 | 23 40 43.38 | 2.1338 | 4 24 42.4 | 16.937 | 11 | 1 22 21.99 | 2.1353 | 9 1 26.4 | 16.064 |
| 12 | 23 42 51.34 | 2.1317 | 4 7 45.6 | 16.955 | 12 | 1 24 30.17 | 2.1374 | 9 17 28.6 | 16.009 |
| 13 | 23 44 59.18 | 2.1297 | 3 50 47.8 | 16.971 | 13 | 1 26 38.48 | 2.1397 | 9 33 27.5 | 15.953 |
| 14 | 23 47 6.91 | 2.1279 | 3 33 49.1 | 16.986 | 14 | 1 28 46.93 | 2.1420 | 9 49 23.0 | 15.896 |
| 15 | 23 49 14.53 | 2.1261 | 3 16 49.5 | 17.000 | 15 | 1 30 55.52 | 2.1444 | 10 5 15.0 | 15.837 |
| 16 | 23 51 22.04 | 2.1243 | 2 59 49.1 | 17.011 | 16 | 1 33 4.26 | 2.1469 | 10 21 3.4 | 15.777 |
| 17 | 23 53 29.45 | 2.1227 | 2 42 48.0 | 17.022 | 17 | 1 35 13.15 | 2.1494 | 10 36 48.2 | 15.715 |
| 18 | 23 55 36.77 | 2.1212 | 2 25 46.3 | 17.032 | 18 | 1 37 22.19 | 2.1520 | 10 52 29.2 | 15.651 |
| 19 | 23 57 44.00 | 2.1197 | 2 8 44.1 | 17.039 | 19 | 1 39 31.39 | 2.1547 | 11 8 6.3 | 15.585 |
| 20 | 23 59 51.14 | 2.1183 | 1 51 41.6 | 17.043 | 20 | 1 41 40.75 | 2.1574 | 11 23 39.4 | 15.518 |
| 21 | 0 1 58.20 | 2.1170 | 1 34 38.8 | 17.049 | 21 | 1 43 50.27 | 2.1603 | 11 39 8.5 | 15.451 |
| 22 | 0 4 5.19 | 2.1159 | 1 17 35.8 | 17.051 | 22 | 1 45 59.97 | 2.1632 | 11 54 33.5 | 15.382 |
| 23 | 0 6 12.11 | 2.1149 | S. 1 0 32.7 | 17.052 | 23 | 1 48 9.85 | 2.1662 | N.12 9 54.3 | 15.311 |
| | TUESDAY 22. | | | | | THURSDAY 24. | | | |
| 0 | 0 8 18.97 | 2.1139 | S. 0 43 29.5 | 17.051 | 0 | 1 50 19.91 | 2.1692 | N.12 25 10.8 | 15.238 |
| 1 | 0 10 25.78 | 2.1130 | 0 26 26.4 | 17.050 | 1 | 1 52 30.15 | 2.1723 | 12 40 22.9 | 15.165 |
| 2 | 0 12 32.54 | 2.1122 | S. 0 9 23.5 | 17.047 | 2 | 1 54 40.58 | 2.1755 | 12 55 30.6 | 15.091 |
| 3 | 0 14 39.25 | 2.1115 | N. 0 7 39.1 | 17.041 | 3 | 1 56 51.90 | 2.1787 | 13 10 33.8 | 15.015 |
| 4 | 0 16 45.92 | 2.1109 | 0 24 41.4 | 17.034 | 4 | 1 59 2.02 | 2.1820 | 13 25 32.4 | 14.937 |
| 5 | 0 18 52.55 | 2.1104 | 0 41 43.2 | 17.025 | 5 | 2 1 13.04 | 2.1854 | 13 40 26.3 | 14.858 |
| 6 | 0 20 59.16 | 2.1100 | 0 58 44.4 | 17.015 | 6 | 2 3 24.27 | 2.1889 | 13 55 15.4 | 14.777 |
| 7 | 0 23 5.75 | 2.1097 | 1 15 45.0 | 17.003 | 7 | 2 5 35.71 | 2.1923 | 14 9 59.6 | 14.695 |
| 8 | 0 25 12.32 | 2.1094 | 1 32 44.8 | 16.990 | 8 | 2 7 47.35 | 2.1957 | 14 24 38.8 | 14.611 |
| 9 | 0 27 18.88 | 2.1092 | 1 49 43.8 | 16.976 | 9 | 2 9 59.20 | 2.1993 | 14 39 12.9 | 14.526 |
| 10 | 0 29 25.43 | 2.1090 | 2 6 41.9 | 16.959 | 10 | 2 12 11.27 | 2.2030 | 14 53 41.9 | 14.440 |
| 11 | 0 31 31.97 | 2.1089 | 2 23 38.9 | 16.941 | 11 | 2 14 23.56 | 2.2067 | 15 8 5.7 | 14.352 |
| 12 | 0 33 38.50 | 2.1090 | 2 40 34.8 | 16.922 | 12 | 2 16 36.07 | 2.2104 | 15 22 24.2 | 14.263 |
| 13 | 0 35 45.04 | 2.1092 | 2 57 29.5 | 16.901 | 13 | 2 18 48.81 | 2.2142 | 15 36 37.2 | 14.171 |
| 14 | 0 37 51.60 | 2.1096 | 3 14 22.9 | 16.878 | 14 | 2 21 1.78 | 2.2181 | 15 50 44.7 | 14.079 |
| 15 | 0 39 58.19 | 2.1101 | 3 31 14.9 | 16.854 | 15 | 2 23 14.98 | 2.2220 | 16 4 46.7 | 13.986 |
| 16 | 0 42 4.81 | 2.1106 | 3 48 5.4 | 16.829 | 16 | 2 25 28.42 | 2.2261 | 16 18 43.1 | 13.891 |
| 17 | 0 44 11.46 | 2.1111 | 4 4 54.4 | 16.803 | 17 | 2 27 42.11 | 2.2302 | 16 32 33.7 | 13.795 |
| 18 | 0 46 18.14 | 2.1116 | 4 21 41.8 | 16.775 | 18 | 2 29 56.05 | 2.2343 | 16 46 18.5 | 13.697 |
| 19 | 0 48 24.85 | 2.1122 | 4 38 27.4 | 16.745 | 19 | 2 32 10.23 | 2.2383 | 16 59 57.4 | 13.598 |
| 20 | 0 50 31.60 | 2.1129 | 4 55 11.1 | 16.713 | 20 | 2 34 24.65 | 2.2424 | 17 13 30.3 | 13.498 |
| 21 | 0 52 38.40 | 2.1138 | 5 11 52.9 | 16.680 | 21 | 2 36 39.31 | 2.2466 | 17 26 57.2 | 13.397 |
| 22 | 0 54 45.26 | 2.1149 | 5 28 32.7 | 16.646 | 22 | 2 38 54.23 | 2.2508 | 17 40 18.0 | 13.294 |
| 23 | 0 56 52.19 | 2.1160 | 5 45 10.4 | 16.610 | 23 | 2 41 9.41 | 2.2551 | 17 53 32.6 | 13.189 |
| 24 | 0 58 59.19 | 2.1172 | N. 6 1 45.9 | 16.572 | 24 | 2 43 24.85 | 2.2594 | N.18 6 40.8 | 13.083 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### FRIDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 43 24.85 | 2.2594 | N.18 6 40.8 | 13.083 |
| 1 | 2 45 40.55 | 2.2637 | 18 19 42.6 | 12.976 |
| 2 | 2 47 56.50 | 2.2680 | 18 32 37.9 | 12.867 |
| 3 | 2 50 12.71 | 2.2723 | 18 45 26.7 | 12.757 |
| 4 | 2 52 29.18 | 2.2767 | 18 58 8.9 | 12.647 |
| 5 | 2 54 45.92 | 2.2811 | 19 10 44.4 | 12.535 |
| 6 | 2 57 2.92 | 2.2855 | 19 23 13.1 | 12.421 |
| 7 | 2 59 20.18 | 2.2899 | 19 35 34.9 | 12.305 |
| 8 | 3 1 37.71 | 2.2944 | 19 47 49.7 | 12.188 |
| 9 | 3 3 55.51 | 2.2990 | 19 59 57.5 | 12.071 |
| 10 | 3 6 13.59 | 2.3037 | 20 11 58.2 | 11.953 |
| 11 | 3 8 31.95 | 2.3083 | 20 23 51.8 | 11.833 |
| 12 | 3 10 50.59 | 2.3129 | 20 35 38.2 | 11.711 |
| 13 | 3 13 9.50 | 2.3174 | 20 47 17.2 | 11.587 |
| 14 | 3 15 28.68 | 2.3220 | 20 58 48.7 | 11.462 |
| 15 | 3 17 48.13 | 2.3266 | 21 10 12.7 | 11.337 |
| 16 | 3 20 7.86 | 2.3312 | 21 21 29.2 | 11.211 |
| 17 | 3 22 27.87 | 2.3357 | 21 32 38.0 | 11.083 |
| 18 | 3 24 48.15 | 2.3402 | 21 43 39.1 | 10.953 |
| 19 | 3 27 8.70 | 2.3447 | 21 54 32.4 | 10.822 |
| 20 | 3 29 29.52 | 2.3492 | 22 5 17.8 | 10.690 |
| 21 | 3 31 50.61 | 2.3537 | 22 15 55.2 | 10.557 |
| 22 | 3 34 11.97 | 2.3582 | 22 26 24.6 | 10.423 |
| 23 | 3 36 33.60 | 2.3627 | N.22 36 46.0 | 10.288 |

#### SATURDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 3 38 55.50 | 2.3672 | N.22 46 59.2 | 10.151 |
| 1 | 3 41 17.66 | 2.3716 | 22 57 4.3 | 10.013 |
| 2 | 3 43 40.08 | 2.3759 | 23 7 0.9 | 9.873 |
| 3 | 3 46 2.77 | 2.3803 | 23 16 49.1 | 9.733 |
| 4 | 3 48 25.72 | 2.3846 | 23 26 28.9 | 9.592 |
| 5 | 3 50 48.93 | 2.3889 | 23 36 0.2 | 9.450 |
| 6 | 3 53 12.39 | 2.3932 | 23 45 22.9 | 9.306 |
| 7 | 3 55 36.11 | 2.3974 | 23 54 36.9 | 9.161 |
| 8 | 3 58 0.08 | 2.4015 | 24 3 42.2 | 9.015 |
| 9 | 4 0 24.29 | 2.4056 | 24 12 38.8 | 8.868 |
| 10 | 4 2 48.75 | 2.4097 | 24 21 26.6 | 8.720 |
| 11 | 4 5 13.46 | 2.4137 | 24 30 5.5 | 8.571 |
| 12 | 4 7 38.41 | 2.4177 | 24 38 35.3 | 8.422 |
| 13 | 4 10 3.59 | 2.4216 | 24 46 56.2 | 8.271 |
| 14 | 4 12 29.00 | 2.4254 | 24 55 7.9 | 8.119 |
| 15 | 4 14 54.64 | 2.4292 | 25 3 10.5 | 7.966 |
| 16 | 4 17 20.51 | 2.4330 | 25 11 3.9 | 7.813 |
| 17 | 4 19 46.60 | 2.4367 | 25 18 48.1 | 7.659 |
| 18 | 4 22 12.92 | 2.4404 | 25 26 23.0 | 7.504 |
| 19 | 4 24 39.45 | 2.4439 | 25 33 48.5 | 7.347 |
| 20 | 4 27 6.19 | 2.4473 | 25 41 4.6 | 7.189 |
| 21 | 4 29 33.13 | 2.4507 | 25 48 11.2 | 7.031 |
| 22 | 4 32 0.27 | 2.4539 | 25 55 8.3 | 6.872 |
| 23 | 4 34 27.60 | 2.4571 | 26 1 55.8 | 6.712 |
| 24 | 4 36 55.12 | 2.4602 | N.26 8 33.7 | 6.551 |

#### SUNDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 4 36 55.12 | 2.4602 | N.26 8 33.7 | 6.551 |
| 1 | 4 39 22.82 | 2.4632 | 26 15 1.9 | 6.389 |
| 2 | 4 41 50.70 | 2.4662 | 26 21 20.4 | 6.227 |
| 3 | 4 44 18.77 | 2.4691 | 26 27 29.2 | 6.064 |
| 4 | 4 46 47.00 | 2.4718 | 26 33 28.2 | 5.901 |
| 5 | 4 49 15.39 | 2.4745 | 26 39 17.3 | 5.737 |
| 6 | 4 51 43.94 | 2.4770 | 26 44 56.6 | 5.572 |
| 7 | 4 54 12.63 | 2.4794 | 26 50 26.0 | 5.406 |
| 8 | 4 56 41.46 | 2.4817 | 26 55 45.4 | 5.240 |
| 9 | 4 59 10.43 | 2.4839 | 27 0 54.8 | 5.074 |
| 10 | 5 1 39.53 | 2.4861 | 27 5 54.2 | 4.907 |
| 11 | 5 4 8.76 | 2.4882 | 27 10 43.6 | 4.739 |
| 12 | 5 6 38.11 | 2.4901 | 27 15 22.9 | 4.571 |
| 13 | 5 9 7.57 | 2.4918 | 27 19 52.1 | 4.402 |
| 14 | 5 11 37.12 | 2.4933 | 27 24 11.2 | 4.233 |
| 15 | 5 14 6.76 | 2.4948 | 27 28 20.1 | 4.063 |
| 16 | 5 16 36.49 | 2.4962 | 27 32 18.8 | 3.893 |
| 17 | 5 19 6.31 | 2.4975 | 27 36 7.3 | 3.723 |
| 18 | 5 21 36.21 | 2.4987 | 27 39 45.6 | 3.553 |
| 19 | 5 24 6.17 | 2.4998 | 27 43 13.7 | 3.383 |
| 20 | 5 26 36.19 | 2.5008 | 27 46 31.5 | 3.212 |
| 21 | 5 29 6.26 | 2.5016 | 27 49 39.1 | 3.041 |
| 22 | 5 31 36.38 | 2.5023 | 27 52 36.4 | 2.869 |
| 23 | 5 34 6.54 | 2.5029 | N.27 55 23.4 | 2.697 |

#### MONDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 5 36 36.73 | 2.5033 | N.27 58 0.1 | 2.525 |
| 1 | 5 39 6.94 | 2.5037 | 28 0 26.5 | 2.353 |
| 2 | 5 41 37.17 | 2.5038 | 28 2 42.5 | 2.181 |
| 3 | 5 44 7.40 | 2.5037 | 28 4 48.2 | 2.009 |
| 4 | 5 46 37.62 | 2.5036 | 28 6 43.6 | 1.837 |
| 5 | 5 49 7.83 | 2.5033 | 28 8 28.7 | 1.665 |
| 6 | 5 51 38.02 | 2.5029 | 28 10 3.4 | 1.493 |
| 7 | 5 54 8.18 | 2.5024 | 28 11 27.8 | 1.321 |
| 8 | 5 56 38.31 | 2.5017 | 28 12 41.9 | 1.149 |
| 9 | 5 59 8.39 | 2.5008 | 28 13 45.8 | 0.977 |
| 10 | 6 1 38.41 | 2.4998 | 28 14 39.4 | 0.806 |
| 11 | 6 4 8.37 | 2.4987 | 28 15 22.7 | 0.635 |
| 12 | 6 6 38.26 | 2.4975 | 28 15 55.7 | 0.464 |
| 13 | 6 9 8.07 | 2.4962 | 28 16 18.4 | 0.293 |
| 14 | 6 11 37.80 | 2.4947 | 28 16 30.9 | 0.122 |
| 15 | 6 14 7.44 | 2.4932 | 28 16 33.1 | 0.048 |
| 16 | 6 16 36.98 | 2.4915 | 28 16 25.1 | 0.217 |
| 17 | 6 19 6.42 | 2.4897 | 28 16 7.0 | 0.386 |
| 18 | 6 21 35.75 | 2.4877 | 28 15 38.8 | 0.555 |
| 19 | 6 24 4.95 | 2.4855 | 28 15 0.4 | 0.724 |
| 20 | 6 26 34.01 | 2.4831 | 28 14 11.9 | 0.892 |
| 21 | 6 29 2.92 | 2.4806 | 28 13 13.3 | 1.060 |
| 22 | 6 31 31.68 | 2.4781 | 28 12 4.7 | 1.227 |
| 23 | 6 34 0.29 | 2.4755 | 28 10 46.1 | 1.394 |
| 24 | 6 36 28.74 | 2.4727 | N.28 9 17.5 | 1.560 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 6 36 28.74 | 2.4727 | N.28 9 17.5 | 1.560 |
| 1 | 6 38 57.02 | 2.4698 | 28 7 38.9 | 1.726 |
| 2 | 6 41 25.13 | 2.4668 | 28 5 50.4 | 1.891 |
| 3 | 6 43 53.05 | 2.4637 | 28 3 52.0 | 2.055 |
| 4 | 6 46 20.77 | 2.4606 | 28 1 43.8 | 2.219 |
| 5 | 6 48 48.29 | 2.4569 | 27 59 25.8 | 2.382 |
| 6 | 6 51 15.60 | 2.4534 | 27 56 58.0 | 2.544 |
| 7 | 6 53 42.70 | 2.4498 | 27 54 20.5 | 2.706 |
| 8 | 6 56 9.58 | 2.4461 | 27 51 33.4 | 2.866 |
| 9 | 6 58 36.23 | 2.4421 | 27 48 36.7 | 3.026 |
| 10 | 7 1 2.64 | 2.4381 | 27 45 30.4 | 3.184 |
| 11 | 7 3 28.79 | 2.4339 | 27 42 14.6 | 3.342 |
| 12 | 7 5 54.70 | 2.4297 | 27 38 49.3 | 3.499 |
| 13 | 7 8 20.36 | 2.4253 | 27 35 14.6 | 3.656 |
| 14 | 7 10 45.75 | 2.4209 | 27 31 30.6 | 3.811 |
| 15 | 7 13 10.87 | 2.4164 | 27 27 37.3 | 3.965 |
| 16 | 7 15 35.72 | 2.4118 | 27 23 34.8 | 4.118 |
| 17 | 7 18 0.29 | 2.4072 | 27 19 23.1 | 4.271 |
| 18 | 7 20 24.58 | 2.4024 | 27 15 2.3 | 4.423 |
| 19 | 7 22 48.58 | 2.3975 | 27 10 32.5 | 4.574 |
| 20 | 7 25 12.28 | 2.3925 | 27 5 53.6 | 4.723 |
| 21 | 7 27 35.68 | 2.3875 | 27 1 5.7 | 4.871 |
| 22 | 7 29 58.78 | 2.3823 | 26 56 9.0 | 5.018 |
| 23 | 7 32 21.56 | 2.3770 | N.26 51 3.5 | 5.165 |

### WEDNESDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 7 34 44.02 | 2.3717 | N.26 45 49.2 | 5.311 |
| 1 | 7 37 6.16 | 2.3663 | 26 40 26.2 | 5.455 |
| 2 | 7 39 27.98 | 2.3609 | 26 34 54.6 | 5.597 |
| 3 | 7 41 49.47 | 2.3553 | 26 29 14.5 | 5.739 |
| 4 | 7 44 10.62 | 2.3497 | 26 23 25.9 | 5.880 |
| 5 | 7 46 31.43 | 2.3440 | 26 17 28.9 | 6.020 |
| 6 | 7 48 51.90 | 2.3383 | 26 11 23.5 | 6.159 |
| 7 | 7 51 12.03 | 2.3325 | 26 5 9.8 | 6.297 |
| 8 | 7 53 31.81 | 2.3267 | 25 58 47.9 | 6.433 |
| 9 | 7 55 51.24 | 2.3208 | 25 52 17.8 | 6.568 |
| 10 | 7 58 10.31 | 2.3148 | 25 45 39.7 | 6.701 |
| 11 | 8 0 29.02 | 2.3088 | 25 38 53.7 | 6.832 |
| 12 | 8 2 47.37 | 2.3028 | 25 31 59.8 | 6.963 |
| 13 | 8 5 5.36 | 2.2967 | 25 24 58.1 | 7.093 |
| 14 | 8 7 22.98 | 2.2905 | 25 17 48.6 | 7.222 |
| 15 | 8 9 40.23 | 2.2843 | 25 10 31.5 | 7.349 |
| 16 | 8 11 57.10 | 2.2780 | 25 3 6.8 | 7.475 |
| 17 | 8 14 13.59 | 2.2718 | 24 55 34.5 | 7.600 |
| 18 | 8 16 29.71 | 2.2655 | 24 47 54.7 | 7.724 |
| 19 | 8 18 45.45 | 2.2592 | 24 40 7.6 | 7.846 |
| 20 | 8 21 0.81 | 2.2528 | 24 32 13.2 | 7.967 |
| 21 | 8 23 15.79 | 2.2464 | 24 24 11.6 | 8.087 |
| 22 | 8 25 30.38 | 2.2399 | 24 16 2.8 | 8.205 |
| 23 | 8 27 44.58 | 2.2335 | 24 7 47.0 | 8.322 |
| 24 | 8 29 58.40 | 2.2271 | N.23 59 24.2 | 8.437 |

### THURSDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 29 58.40 | 2.2271 | N.23 59 24.2 | 8.437 |
| 1 | 8 32 11.83 | 2.2206 | 23 50 54.5 | 8.551 |
| 2 | 8 34 24.87 | 2.2142 | 23 42 18.0 | 8.664 |
| 3 | 8 36 37.53 | 2.2077 | 23 33 34.8 | 8.776 |
| 4 | 8 38 49.80 | 2.2012 | 23 24 44.9 | 8.887 |
| 5 | 8 41 1.68 | 2.1947 | 23 15 48.4 | 8.996 |
| 6 | 8 43 13.16 | 2.1882 | 23 6 45.4 | 9.103 |
| 7 | 8 45 24.25 | 2.1817 | 22 57 36.0 | 9.210 |
| 8 | 8 47 34.95 | 2.1752 | 22 48 20.2 | 9.315 |
| 9 | 8 49 45.26 | 2.1687 | 22 38 58.1 | 9.419 |
| 10 | 8 51 55.18 | 2.1622 | 22 29 29.9 | 9.521 |
| 11 | 8 54 4.72 | 2.1557 | 22 19 55.6 | 9.622 |
| 12 | 8 56 13.87 | 2.1492 | 22 10 15.3 | 9.721 |
| 13 | 8 58 22.63 | 2.1427 | 22 0 29.1 | 9.819 |
| 14 | 9 0 31.00 | 2.1363 | 21 50 37.0 | 9.916 |
| 15 | 9 2 38.97 | 2.1299 | 21 40 39.1 | 10.012 |
| 16 | 9 4 46.57 | 2.1234 | 21 30 35.4 | 10.107 |
| 17 | 9 6 53.78 | 2.1169 | 21 20 26.1 | 10.200 |
| 18 | 9 9 0.60 | 2.1104 | 21 10 11.3 | 10.292 |
| 19 | 9 11 7.03 | 2.1040 | 20 59 51.0 | 10.383 |
| 20 | 9 13 13.08 | 2.0977 | 20 49 25.3 | 10.473 |
| 21 | 9 15 18.75 | 2.0914 | 20 38 54.2 | 10.561 |
| 22 | 9 17 24.05 | 2.0851 | 20 28 17.9 | 10.647 |
| 23 | 9 19 28.97 | 2.0788 | N.20 17 36.5 | 10.732 |

### FRIDAY, AUGUST 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 9 21 33.51 | 2.0725 | N.20 6 50.0 | 10.816 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ● New Moon, . . | 1 | 21 | 30.6 |
| ☽ First Quarter, . | 9 | 19 | 22.2 |
| ○ Full Moon, . . | 17 | 9 | 31.2 |
| ☾ Last Quarter, . . | 24 | 3 | 2.1 |
| ● New Moon, . . | 31 | 9 | 8.6 |

| | Day. | h. |
|---|---|---|
| ☾ Apogee, . . . . | 8 | 18.9 |
| ☾ Perigee, . . . . | 20 | 20.6 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 4 | Sun | W. | 25 47 14 | 3206 | 27 13 16 | 3211 | 28 39 12 | 3219 | 30 4 59 | 3225 |
| | Mars | E. | 68 33 56 | 2939 | 67 2 27 | 2952 | 65 31 14 | 2965 | 64 0 17 | 2977 |
| | Spica | E. | 74 6 20 | 2785 | 72 31 32 | 2797 | 70 57 0 | 2809 | 69 22 43 | 2821 |
| | Antares | E. | 120 0 13 | 2782 | 118 25 22 | 2796 | 116 50 47 | 2806 | 115 16 27 | 2818 |
| 5 | Sun | W. | 37 11 41 | 3268 | 38 36 30 | 3276 | 40 1 9 | 3287 | 41 25 36 | 3296 |
| | Mars | E. | 56 29 23 | 3038 | 54 59 57 | 3049 | 53 30 45 | 3060 | 52 1 47 | 3072 |
| | Spica | E. | 61 35 7 | 2877 | 60 2 19 | 2889 | 58 29 46 | 2900 | 56 57 27 | 2910 |
| | Antares | E. | 107 28 36 | 2876 | 105 55 46 | 2886 | 104 23 9 | 2897 | 102 50 46 | 2907 |
| 6 | Sun | W. | 48 25 13 | 3341 | 49 48 37 | 3350 | 51 11 51 | 3358 | 52 34 57 | 3366 |
| | Mars | E. | 44 40 17 | 3124 | 43 12 36 | 3133 | 41 45 7 | 3143 | 40 17 49 | 3152 |
| | Spica | E. | 49 19 8 | 2960 | 47 48 5 | 2969 | 46 17 13 | 2978 | 44 46 33 | 2987 |
| | Antares | E. | 95 12 6 | 2957 | 93 40 59 | 2965 | 92 10 2 | 2973 | 90 39 16 | 2982 |
| 7 | Sun | W. | 59 28 5 | 3402 | 60 50 19 | 3408 | 62 12 26 | 3415 | 63 34 26 | 3420 |
| | Regulus | W. | 17 13 57 | 3106 | 18 41 59 | 3101 | 20 10 8 | 3096 | 21 38 22 | 3094 |
| | Mars | E. | 33 3 54 | 3191 | 31 37 34 | 3198 | 30 11 22 | 3204 | 28 45 17 | 3210 |
| | Spica | E. | 37 15 47 | 3025 | 35 46 5 | 3031 | 34 16 31 | 3038 | 32 47 5 | 3044 |
| | Antares | E. | 83 7 57 | 3019 | 81 38 8 | 3025 | 80 8 26 | 3030 | 78 38 51 | 3036 |
| 8 | Sun | W. | 70 23 6 | 3441 | 71 44 36 | 3443 | 73 6 4 | 3446 | 74 27 29 | 3447 |
| | Regulus | W. | 29 0 1 | 3091 | 30 28 22 | 3091 | 31 56 43 | 3091 | 33 25 4 | 3091 |
| | Spica | E. | 25 21 43 | 3070 | 23 52 57 | 3074 | 22 24 16 | 3079 | 20 55 41 | 3084 |
| | Antares | E. | 71 12 31 | 3057 | 69 43 28 | 3060 | 68 14 29 | 3063 | 66 45 34 | 3065 |
| | *a* Aquilæ | E. | 117 11 39 | 4155 | 116 2 30 | 4131 | 114 52 58 | 4107 | 113 43 3 | 4083 |
| 9 | Sun | W. | 81 14 12 | 3450 | 82 35 32 | 3448 | 83 56 54 | 3447 | 85 18 17 | 3445 |
| | Regulus | W. | 40 47 0 | 3086 | 42 15 27 | 3084 | 43 43 56 | 3081 | 45 12 29 | 3079 |
| | Antares | E. | 59 21 22 | 3067 | 57 52 32 | 3066 | 56 23 41 | 3065 | 54 54 49 | 3063 |
| | *a* Aquilæ | E. | 107 48 35 | 3996 | 106 36 51 | 3979 | 105 24 51 | 3964 | 104 12 36 | 3951 |
| 10 | Sun | W. | 92 6 0 | 3427 | 93 27 46 | 3423 | 94 49 37 | 3416 | 96 11 35 | 3410 |
| | Regulus | W. | 52 36 11 | 3059 | 54 5 11 | 3054 | 55 34 17 | 3048 | 57 3 30 | 3042 |
| | Antares | E. | 47 29 42 | 3047 | 46 0 27 | 3042 | 44 31 6 | 3037 | 43 1 39 | 3031 |
| | *a* Aquilæ | E. | 98 8 13 | 3898 | 96 54 46 | 3883 | 95 41 9 | 3873 | 94 27 22 | 3864 |
| 11 | Sun | W. | 103 3 18 | 3373 | 104 26 5 | 3364 | 105 49 3 | 3355 | 107 12 11 | 3345 |
| | Regulus | W. | 64 31 39 | 3005 | 66 1 46 | 2997 | 67 32 3 | 2988 | 69 2 31 | 2978 |
| | Antares | E. | 35 32 30 | 2997 | 34 2 13 | 2988 | 32 31 45 | 2980 | 31 1 7 | 2971 |
| | *a* Aquilæ | E. | 88 16 17 | 3825 | 87 1 41 | 3819 | 85 46 58 | 3814 | 84 32 10 | 3810 |
| | Fomalhaut | E. | 116 54 25 | 3248 | 115 29 13 | 3234 | 114 3 44 | 3220 | 112 37 58 | 3204 |
| 12 | Sun | W. | 114 10 50 | 3291 | 115 35 12 | 3279 | 116 59 48 | 3267 | 118 24 38 | 3256 |
| | Regulus | W. | 76 37 58 | 2925 | 78 9 45 | 2913 | 79 41 47 | 2901 | 81 14 4 | 2891 |
| | Mars | W. | 24 17 57 | 3096 | 25 46 12 | 3083 | 27 14 43 | 3070 | 28 43 29 | 3058 |
| | Spica | W. | 22 34 55 | 2932 | 24 6 33 | 2919 | 25 38 28 | 2906 | 27 10 40 | 2892 |
| | Antares | E. | 23 24 57 | 2920 | 21 53 4 | 2909 | 20 20 56 | 2898 | 18 48 34 | 2887 |
| | *a* Aquilæ | E. | 78 17 11 | 3794 | 77 2 3 | 3794 | 75 46 55 | 3794 | 74 31 47 | 3795 |
| | Fomalhaut | E. | 105 24 49 | 3133 | 103 57 20 | 3119 | 102 29 33 | 3105 | 101 1 29 | 3091 |
| | *a* Pegasi | E. | 125 27 10 | 3411 | 124 5 6 | 3383 | 122 42 30 | 3355 | 121 19 22 | 3327 |
| 13 | Sun | W. | 125 32 41 | 3187 | 126 59 6 | 3173 | 128 25 48 | 3159 | 129 52 45 | 3145 |
| | Regulus | W. | 88 59 22 | 2825 | 90 33 17 | 2811 | 92 7 31 | 2797 | 93 42 3 | 2783 |
| | Mars | W. | 36 11 15 | 2991 | 37 41 39 | 2977 | 39 12 21 | 2962 | 40 43 21 | 2947 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 4 | Sun | W. | 31 30 39 | 3232 | 32 56 10 | 3241 | 34 21 31 | 3250 | 35 46 41 | 3259 |
| | Mars | E. | 62 29 36 | 2990 | 60 59 11 | 3001 | 59 29 0 | 3014 | 57 59 4 | 3026 |
| | Spica | E. | 67 48 42 | 2832 | 66 14 56 | 2844 | 64 41 25 | 2855 | 63 8 9 | 2866 |
| | Antares | E. | 113 42 23 | 2830 | 112 8 34 | 2842 | 110 35 0 | 2853 | 109 1 41 | 2864 |
| 5 | Sun | W. | 42 49 53 | 3306 | 44 13 59 | 3314 | 45 37 54 | 3323 | 47 1 39 | 3332 |
| | Mars | E. | 50 33 3 | 3083 | 49 4 33 | 3093 | 47 36 15 | 3104 | 46 8 10 | 3114 |
| | Spica | E. | 55 25 21 | 2921 | 53 53 29 | 2931 | 52 21 50 | 2941 | 50 50 23 | 2950 |
| | Antares | E. | 101 18 36 | 2918 | 99 46 40 | 2928 | 98 14 56 | 2938 | 96 43 25 | 2947 |
| 6 | Sun | W. | 53 57 52 | 3374 | 55 20 36 | 3381 | 56 43 14 | 3389 | 58 5 43 | 3395 |
| | Mars | E. | 38 50 42 | 3161 | 37 23 46 | 3168 | 35 56 59 | 3177 | 34 30 22 | 3184 |
| | Spica | E. | 43 16 4 | 2995 | 41 45 45 | 3003 | 40 15 36 | 3011 | 38 45 37 | 3018 |
| | Antares | E. | 89 8 41 | 2990 | 87 38 16 | 2997 | 86 8 0 | 3005 | 84 37 54 | 3013 |
| 7 | Sun | W. | 64 56 20 | 3426 | 66 18 8 | 3429 | 67 39 52 | 3433 | 69 1 31 | 3437 |
| | Regulus | W. | 23 6 39 | 3092 | 24 34 58 | 3091 | 26 3 18 | 3091 | 27 31 39 | 3090 |
| | Mars | E. | 27 19 20 | 3216 | 25 53 30 | 3221 | 24 27 46 | 3226 | 23 2 8 | 3231 |
| | Spica | E. | 31 17 47 | 3050 | 29 48 36 | 3056 | 28 19 32 | 3060 | 26 50 34 | 3066 |
| | Antares | E. | 77 9 23 | 3042 | 75 40 2 | 3047 | 74 10 47 | 3051 | 72 41 37 | 3054 |
| 8 | Sun | W. | 75 48 52 | 3449 | 77 10 13 | 3450 | 78 31 33 | 3451 | 79 52 52 | 3450 |
| | Regulus | W. | 34 53 25 | 3090 | 36 21 47 | 3089 | 37 50 10 | 3088 | 39 18 34 | 3087 |
| | Spica | E. | 19 27 12 | 3088 | 17 58 48 | 3098 | 16 30 30 | 3098 | 15 2 18 | 3104 |
| | Antares | E. | 65 16 41 | 3066 | 63 47 50 | 3068 | 62 19 1 | 3068 | 60 50 12 | 3067 |
| | *a* Aquilæ | E. | 112 32 47 | 4065 | 111 22 10 | 4045 | 110 11 16 | 4028 | 109 0 4 | 4011 |
| 9 | Sun | W. | 86 39 43 | 3443 | 88 1 11 | 3439 | 89 22 43 | 3436 | 90 44 19 | 3431 |
| | Regulus | W. | 46 41 5 | 3076 | 48 9 44 | 3072 | 49 38 28 | 3068 | 51 7 17 | 3064 |
| | Antares | E. | 53 25 54 | 3060 | 51 56 56 | 3059 | 50 27 56 | 3056 | 48 58 52 | 3052 |
| | *a* Aquilæ | E. | 103 0 8 | 3938 | 101 47 27 | 3926 | 100 34 34 | 3915 | 99 21 29 | 3904 |
| 10 | Sun | W. | 97 33 40 | 3404 | 98 55 52 | 3397 | 100 18 12 | 3389 | 101 40 41 | 3382 |
| | Regulus | W. | 58 32 51 | 3035 | 60 2 20 | 3029 | 61 31 57 | 3022 | 63 1 43 | 3014 |
| | Antares | E. | 41 32 5 | 3026 | 40 2 24 | 3019 | 38 32 35 | 3012 | 37 2 37 | 3005 |
| | *a* Aquilæ | E. | 93 13 25 | 3856 | 91 59 20 | 3848 | 90 45 7 | 3840 | 89 30 46 | 3832 |
| 11 | Sun | W. | 108 35 31 | 3335 | 109 59 2 | 3325 | 111 22 45 | 3313 | 112 46 41 | 3302 |
| | Regulus | W. | 70 33 11 | 2969 | 72 4 3 | 2958 | 73 35 8 | 2947 | 75 6 27 | 2937 |
| | Antares | E. | 29 30 18 | 2962 | 27 59 17 | 2951 | 26 28 3 | 2942 | 24 56 37 | 2931 |
| | *a* Aquilæ | E. | 83 17 18 | 3806 | 82 2 22 | 3801 | 80 47 22 | 3798 | 79 32 18 | 3795 |
| | Fomalhaut | E. | 111 11 54 | 3190 | 109 45 34 | 3176 | 108 18 56 | 3162 | 106 52 1 | 3148 |
| 12 | Sun | W. | 119 49 44 | 3241 | 121 15 5 | 3228 | 122 40 41 | 3214 | 124 6 33 | 3201 |
| | Regulus | W. | 82 46 35 | 2878 | 84 19 22 | 2866 | 85 52 25 | 2852 | 87 25 45 | 2839 |
| | Mars | W. | 30 12 30 | 3045 | 31 41 47 | 3032 | 33 11 20 | 3019 | 34 41 9 | 3005 |
| | Spica | W. | 28 43 9 | 2879 | 30 15 55 | 2866 | 31 48 58 | 2852 | 33 22 19 | 2838 |
| | Antares | E. | 17 15 58 | 2875 | 15 43 7 | 2863 | 14 10 1 | 2852 | 12 36 40 | 2841 |
| | *a* Aquilæ | E. | 73 16 40 | 3798 | 72 1 36 | 3802 | 70 46 36 | 3807 | 69 31 41 | 3814 |
| | Fomalhaut | E. | 99 33 8 | 3076 | 98 4 29 | 3062 | 96 35 33 | 3047 | 95 6 19 | 3034 |
| | *a* Pegasi | E. | 119 55 42 | 3301 | 118 31 31 | 3276 | 117 6 52 | 3251 | 115 41 43 | 3227 |
| 13 | Sun | W. | 131 20 0 | 3130 | 132 47 33 | 3116 | 134 15 23 | 3102 | 135 43 30 | 3088 |
| | Regulus | W. | 95 16 53 | 2768 | 96 52 3 | 2754 | 98 27 31 | 2739 | 100 3 19 | 2724 |
| | Mars | W. | 42 14 40 | 2232 | 43 46 18 | 2917 | 45 18 15 | 2902 | 46 50 31 | 2887 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 13 | Spica | W. | 34 55 58 | 2824 | 36 29 55 | 2809 | 38 4 11 | 2795 | 39 38 46 | 2780 |
| | α Aquilæ | E. | 68 16 53 | 3821 | 67 2 13 | 3832 | 65 47 44 | 3845 | 64 33 28 | 3858 |
| | Fomalhaut | E. | 93 36 48 | 3019 | 92 6 59 | 3005 | 90 36 52 | 2991 | 89 6 28 | 2977 |
| | α Pegasi | E. | 114 16 6 | 3204 | 112 50 2 | 3182 | 111 23 31 | 3159 | 109 56 33 | 3138 |
| 14 | Regulus | W. | 101 39 27 | 2710 | 103 15 54 | 2695 | 104 52 41 | 2680 | 106 29 48 | 2664 |
| | Mars | W. | 48 23 7 | 2872 | 49 56 2 | 2857 | 51 29 16 | 2842 | 53 2 50 | 2826 |
| | Spica | W. | 47 36 32 | 2704 | 49 13 6 | 2690 | 50 49 59 | 2675 | 52 27 13 | 2660 |
| | α Aquilæ | E. | 58 26 29 | 3967 | 57 14 17 | 4001 | 56 2 38 | 4038 | 54 51 36 | 4079 |
| | Fomalhaut | E. | 81 30 4 | 2909 | 79 57 56 | 2896 | 78 25 32 | 2883 | 76 52 52 | 2871 |
| | α Pegasi | E. | 102 35 22 | 3037 | 101 5 55 | 3018 | 99 36 4 | 2999 | 98 5 50 | 2981 |
| | Jupiter | E. | 119 10 5 | 2717 | 117 33 48 | 2702 | 115 57 11 | 2687 | 114 20 13 | 2673 |
| 15 | Mars | W. | 60 55 51 | 2747 | 62 31 29 | 2731 | 64 7 28 | 2716 | 65 43 47 | 2700 |
| | Spica | W. | 60 38 36 | 2582 | 62 17 56 | 2567 | 63 57 36 | 2551 | 65 37 38 | 2536 |
| | Antares | W. | 14 44 17 | 2585 | 16 23 32 | 2569 | 18 3 10 | 2553 | 19 43 9 | 2538 |
| | Fomalhaut | E. | 69 5 42 | 2816 | 67 31 35 | 2806 | 65 57 15 | 2798 | 64 22 44 | 2789 |
| | α Pegasi | E. | 90 29 16 | 2899 | 88 56 56 | 2884 | 87 24 17 | 2870 | 85 51 20 | 2856 |
| | Jupiter | E. | 106 10 10 | 2593 | 104 31 6 | 2578 | 102 51 41 | 2563 | 101 11 56 | 2548 |
| 16 | Mars | W. | 73 50 30 | 2625 | 75 28 51 | 2611 | 77 7 31 | 2596 | 78 46 31 | 2583 |
| | Spica | W. | 74 2 55 | 2463 | 75 45 0 | 2450 | 77 27 24 | 2436 | 79 10 8 | 2423 |
| | Antares | W. | 28 8 26 | 2463 | 29 50 31 | 2449 | 31 32 56 | 2435 | 33 15 41 | 2422 |
| | Fomalhaut | E. | 56 27 57 | 2766 | 54 52 44 | 2765 | 53 17 30 | 2766 | 51 42 17 | 2768 |
| | α Pegasi | E. | 78 2 25 | 2798 | 76 27 55 | 2789 | 74 53 13 | 2781 | 73 18 21 | 2773 |
| | Jupiter | E. | 92 47 55 | 2475 | 91 6 6 | 2460 | 89 23 57 | 2446 | 87 41 28 | 2433 |
| | α Arietis | E. | 120 1 3 | 2525 | 118 20 25 | 2509 | 116 39 24 | 2492 | 114 58 0 | 2478 |
| 17 | Mars | W. | 87 6 6 | 2518 | 88 46 54 | 2507 | 90 27 58 | 2494 | 92 9 19 | 2484 |
| | Spica | W. | 87 48 28 | 2359 | 89 33 2 | 2347 | 91 17 53 | 2336 | 93 3 0 | 2325 |
| | Antares | W. | 41 54 8 | 2357 | 43 38 44 | 2346 | 45 23 36 | 2335 | 47 8 45 | 2324 |
| | Fomalhaut | E. | 43 48 6 | 2819 | 42 14 3 | 2840 | 40 40 27 | 2866 | 39 7 24 | 2896 |
| | α Pegasi | E. | 65 22 2 | 2755 | 63 46 35 | 2755 | 62 11 8 | 2757 | 60 35 44 | 2762 |
| | Jupiter | E. | 79 4 20 | 2368 | 77 19 59 | 2356 | 75 35 21 | 2345 | 73 50 27 | 2334 |
| | α Arietis | E. | 106 25 59 | 2409 | 104 42 37 | 2396 | 102 58 57 | 2384 | 101 15 0 | 2373 |
| 18 | Mars | W. | 100 39 45 | 2434 | 102 22 31 | 2425 | 104 5 30 | 2417 | 105 48 40 | 2410 |
| | Spica | W. | 101 52 16 | 2278 | 103 38 48 | 2270 | 105 25 32 | 2261 | 107 12 29 | 2253 |
| | Antares | W. | 55 58 17 | 2275 | 57 44 53 | 2266 | 59 31 42 | 2259 | 61 18 42 | 2251 |
| | α Pegasi | E. | 52 41 0 | 2815 | 51 6 52 | 2834 | 49 33 8 | 2857 | 47 59 56 | 2884 |
| | Jupiter | E. | 65 2 11 | 2286 | 63 15 51 | 2277 | 61 29 18 | 2269 | 59 42 33 | 2262 |
| | α Arietis | E. | 92 31 21 | 2323 | 90 45 55 | 2314 | 89 0 16 | 2306 | 87 14 25 | 2299 |
| | Aldebaran | E. | 122 58 36 | 2853 | 121 13 54 | 2842 | 119 28 56 | 2833 | 117 43 44 | 2822 |
| 19 | Antares | W. | 70 16 17 | 2220 | 72 4 14 | 2215 | 73 52 19 | 2211 | 75 40 30 | 2207 |
| | Jupiter | E. | 50 46 6 | 2229 | 48 58 22 | 2225 | 47 10 31 | 2220 | 45 22 34 | 2216 |
| | α Arietis | E. | 78 22 47 | 2270 | 76 36 4 | 2266 | 74 49 14 | 2262 | 73 2 19 | 2260 |
| | Aldebaran | E. | 108 54 23 | 2282 | 107 7 57 | 2277 | 105 21 23 | 2271 | 103 34 41 | 2267 |
| 20 | Antares | W. | 84 42 39 | 2194 | 86 31 15 | 2193 | 88 19 53 | 2192 | 90 8 32 | 2192 |
| | α Aquilæ | W. | 45 39 11 | 4229 | 46 47 10 | 4106 | 47 57 7 | 3992 | 49 8 54 | 3895 |
| | Jupiter | E. | 36 21 30 | 2204 | 34 33 8 | 2202 | 32 44 43 | 2200 | 30 56 16 | 2200 |
| | α Arietis | E. | 64 7 0 | 2254 | 62 19 53 | 2256 | 60 32 48 | 2258 | 58 45 46 | 2259 |
| | Aldebaran | E. | 94 39 45 | 2251 | 92 52 34 | 2250 | 91 5 21 | 2249 | 89 18 6 | 2249 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 13 | Spica | W. | 41 13 40 | 2766 | 42 48 53 | 2750 | 44 24 26 | 2735 | 46 0 19 | 2720 |
| | α Aquilæ | E. | 63 19 25 | 3873 | 62 5 39 | 3893 | 60 52 12 | 3916 | 59 39 8 | 3940 |
| | Fomalhaut | E. | 87 35 46 | 2968 | 86 4 47 | 2949 | 84 33 30 | 2935 | 83 1 55 | 2922 |
| | α Pegasi | E. | 108 29 9 | 3117 | 107 1 20 | 3096 | 105 33 5 | 3076 | 104 4 26 | 3056 |
| 14 | Regulus | W. | 108 7 16 | 2649 | 109 45 4 | 2634 | 111 23 13 | 2619 | 113 1 42 | 2604 |
| | Mars | W. | 54 36 45 | 2810 | 56 11 0 | 2794 | 57 45 36 | 2778 | 59 20 33 | 2762 |
| | Spica | W. | 54 4 48 | 2642 | 55 42 44 | 2627 | 57 21 0 | 2612 | 58 59 38 | 2597 |
| | α Aquilæ | E. | 53 41 14 | 4126 | 52 31 36 | 4177 | 51 22 48 | 4237 | 50 14 57 | 4304 |
| | Fomalhaut | E. | 75 19 56 | 2859 | 73 46 45 | 2847 | 72 13 18 | 2836 | 70 39 37 | 2826 |
| | α Pegasi | E. | 96 35 14 | 2964 | 95 4 16 | 2946 | 93 32 56 | 2931 | 92 1 16 | 2915 |
| | Jupiter | E. | 112 42 55 | 2656 | 111 5 16 | 2640 | 109 27 15 | 2624 | 107 48 53 | 2609 |
| 15 | Mars | W. | 67 20 27 | 2685 | 68 57 27 | 2669 | 70 34 48 | 2655 | 72 12 29 | 2640 |
| | Spica | W. | 67 18 0 | 2521 | 68 58 43 | 2505 | 70 39 47 | 2492 | 72 21 11 | 2478 |
| | Antares | W. | 21 23 30 | 2522 | 23 4 12 | 2507 | 24 45 16 | 2492 | 26 26 41 | 2477 |
| | Fomalhaut | E. | 62 48 2 | 2782 | 61 13 11 | 2776 | 59 38 12 | 2772 | 58 3 7 | 2768 |
| | α Pegasi | E. | 84 18 5 | 2843 | 82 44 33 | 2831 | 81 10 45 | 2819 | 79 36 42 | 2806 |
| | Jupiter | E. | 99 31 49 | 2533 | 97 51 21 | 2518 | 96 10 33 | 2503 | 94 29 24 | 2489 |
| 16 | Mars | W. | 80 25 49 | 2569 | 82 5 26 | 2556 | 83 45 21 | 2543 | 85 25 35 | 2530 |
| | Spica | W. | 80 53 11 | 2409 | 82 36 33 | 2396 | 84 20 13 | 2383 | 86 4 12 | 2371 |
| | Antares | W. | 34 58 45 | 2408 | 36 42 8 | 2395 | 38 25 50 | 2382 | 40 9 50 | 2370 |
| | Fomalhaut | E. | 50 7 7 | 2773 | 48 32 4 | 2780 | 46 57 10 | 2791 | 45 22 30 | 2808 |
| | α Pegasi | E. | 71 43 18 | 2767 | 70 8 7 | 2763 | 68 32 50 | 2759 | 66 57 28 | 2756 |
| | Jupiter | E. | 85 58 40 | 2419 | 84 15 34 | 2406 | 82 32 8 | 2393 | 80 48 23 | 2380 |
| | α Arietis | E. | 113 16 16 | 2464 | 111 34 12 | 2449 | 109 51 47 | 2435 | 108 9 2 | 2422 |
| 17 | Mars | W. | 93 50 55 | 2473 | 95 32 46 | 2462 | 97 14 52 | 2453 | 98 57 12 | 2443 |
| | Spica | W. | 94 48 23 | 2315 | 96 34 1 | 2306 | 98 19 52 | 2296 | 100 5 57 | 2287 |
| | Antares | W. | 48 54 10 | 2313 | 50 39 50 | 2303 | 52 25 45 | 2294 | 54 11 54 | 2284 |
| | Fomalhaut | E. | 37 35 0 | 2934 | 36 3 24 | 2979 | 34 32 45 | 3034 | 33 3 14 | 3098 |
| | α Pegasi | E. | 59 0 26 | 2768 | 57 25 16 | 2775 | 55 50 16 | 2786 | 54 15 30 | 2798 |
| | Jupiter | E. | 72 5 17 | 2324 | 70 19 52 | 2313 | 68 34 12 | 2304 | 66 48 18 | 2295 |
| | α Arietis | E. | 99 30 47 | 2362 | 97 46 17 | 2352 | 96 1 33 | 2342 | 94 16 34 | 2332 |
| 18 | Mars | W. | 107 32 1 | 2403 | 109 15 32 | 2396 | 110 59 13 | 2389 | 112 43 3 | 2384 |
| | Spica | W. | 108 59 38 | 2245 | 110 46 58 | 2239 | 112 34 28 | 2233 | 114 22 7 | 2227 |
| | Antares | W. | 63 5 53 | 2244 | 64 53 15 | 2237 | 66 40 47 | 2231 | 68 28 28 | 2226 |
| | α Pegasi | E. | 46 27 17 | 2916 | 44 55 18 | 2954 | 43 24 7 | 2997 | 41 53 50 | 3046 |
| | Jupiter | E. | 57 55 37 | 2253 | 56 8 29 | 2247 | 54 21 11 | 2240 | 52 33 43 | 2234 |
| | α Arietis | E. | 85 28 24 | 2291 | 83 42 12 | 2286 | 81 55 52 | 2280 | 80 9 23 | 2275 |
| | Aldebaran | E. | 115 58 17 | 2313 | 114 12 37 | 2304 | 112 26 44 | 2296 | 110 40 39 | 2289 |
| 19 | Antares | W. | 77 28 47 | 2204 | 79 17 9 | 2201 | 81 5 35 | 2198 | 82 54 5 | 2196 |
| | Jupiter | E. | 43 34 30 | 2212 | 41 46 21 | 2210 | 39 58 8 | 2207 | 38 9 50 | 2205 |
| | α Arietis | E. | 71 15 20 | 2258 | 69 28 18 | 2256 | 67 41 13 | 2255 | 65 54 7 | 2254 |
| | Aldebaran | E. | 101 47 53 | 2262 | 100 0 58 | 2259 | 98 13 58 | 2256 | 96 26 53 | 2253 |
| 20 | Antares | W. | 91 57 11 | 2192 | 93 45 50 | 2192 | 95 34 29 | 2193 | 97 23 7 | 2194 |
| | α Aquilæ | W. | 50 22 19 | 3806 | 51 37 16 | 3727 | 52 53 35 | 3654 | 54 11 11 | 3589 |
| | Jupiter | E. | 29 7 48 | 2200 | 27 19 21 | 2201 | 25 30 55 | 2202 | 23 42 30 | 2203 |
| | α Arietis | E. | 56 58 46 | 2262 | 55 11 51 | 2264 | 53 24 59 | 2268 | 51 38 13 | 2273 |
| | Aldebaran | E. | 87 30 51 | 2249 | 85 43 36 | 2249 | 83 56 22 | 2251 | 82 9 10 | 2253 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. ° | ′ | ″ | P. L. of Diff. | IIIh ° | ′ | ″ | P. L. of Diff. | VIh. ° | ′ | ″ | P. L. of Diff. | IXh. ° | ′ | ″ | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | Antares | W. | 99 | 11 | 43 | 2196 | 101 | 0 | 17 | 2198 | 102 | 48 | 47 | 2200 | 104 | 37 | 14 | 2203 |
| | α Aquilæ | W. | 55 | 29 | 57 | 3531 | 56 | 49 | 47 | 3478 | 58 | 10 | 36 | 3430 | 59 | 32 | 19 | 3387 |
| | α Arietis | E. | 49 | 51 | 34 | 2279 | 48 | 5 | 4 | 2287 | 46 | 18 | 45 | 2296 | 44 | 32 | 39 | 2305 |
| | Aldebaran | E. | 80 | 22 | 1 | 2255 | 78 | 34 | 55 | 2258 | 76 | 47 | 53 | 2261 | 75 | 0 | 56 | 2265 |
| | Saturn | E. | 109 | 45 | 17 | 2257 | 107 | 58 | 14 | 2258 | 106 | 11 | 13 | 2260 | 104 | 24 | 15 | 2263 |
| | Sun | E. | 131 | 33 | 32 | 2522 | 129 | 52 | 50 | 2522 | 128 | 12 | 8 | 2524 | 126 | 31 | 28 | 2525 |
| 22 | Antares | W. | 113 | 38 | 21 | 2221 | 115 | 26 | 17 | 2226 | 117 | 14 | 6 | 2231 | 119 | 1 | 48 | 2235 |
| | α Aquilæ | W. | 66 | 31 | 31 | 3233 | 67 | 57 | 1 | 3212 | 69 | 22 | 56 | 3193 | 70 | 49 | 13 | 3177 |
| | Fomalhaut | W. | 35 | 2 | 5 | 2877 | 36 | 34 | 53 | 2829 | 38 | 8 | 43 | 2787 | 39 | 43 | 28 | 2751 |
| | α Arietis | E. | 35 | 46 | 6 | 2368 | 34 | 1 | 45 | 2385 | 32 | 17 | 49 | 2407 | 30 | 34 | 24 | 2433 |
| | Aldebaran | E. | 66 | 7 | 46 | 2290 | 64 | 21 | 32 | 2297 | 62 | 35 | 28 | 2304 | 60 | 49 | 34 | 2311 |
| | Saturn | E. | 95 | 30 | 26 | 2279 | 93 | 43 | 56 | 2284 | 91 | 57 | 33 | 2288 | 90 | 11 | 16 | 2293 |
| | Sun | E. | 118 | 8 | 55 | 2540 | 116 | 28 | 38 | 2545 | 114 | 48 | 27 | 2549 | 113 | 8 | 22 | 2553 |
| 23 | α Aquilæ | W. | 78 | 4 | 34 | 3131 | 79 | 32 | 6 | 3127 | 80 | 59 | 43 | 3124 | 82 | 27 | 23 | 3123 |
| | Fomalhaut | W. | 47 | 46 | 59 | 2638 | 49 | 25 | 3 | 2624 | 51 | 3 | 25 | 2612 | 52 | 42 | 3 | 2603 |
| | Aldebaran | E. | 52 | 3 | 0 | 2358 | 50 | 18 | 25 | 2368 | 48 | 34 | 5 | 2380 | 46 | 50 | 2 | 2393 |
| | Saturn | E. | 81 | 21 | 48 | 2322 | 79 | 36 | 20 | 2328 | 77 | 51 | 1 | 2335 | 76 | 5 | 52 | 2342 |
| | Sun | E. | 104 | 49 | 44 | 2581 | 103 | 10 | 23 | 2587 | 101 | 31 | 10 | 2593 | 99 | 52 | 7 | 2601 |
| 24 | α Aquilæ | W. | 89 | 45 | 27 | 3143 | 91 | 12 | 46 | 3151 | 92 | 39 | 53 | 3160 | 94 | 6 | 50 | 3172 |
| | Fomalhaut | W. | 60 | 57 | 37 | 2580 | 62 | 37 | 0 | 2579 | 64 | 16 | 24 | 2579 | 65 | 55 | 48 | 2579 |
| | α Pegasi | W. | 41 | 59 | 6 | 3077 | 43 | 27 | 44 | 3036 | 44 | 57 | 12 | 3000 | 46 | 27 | 25 | 2969 |
| | Jupiter | W. | 21 | 1 | 7 | 2320 | 22 | 46 | 37 | 2327 | 24 | 31 | 57 | 2334 | 26 | 17 | 7 | 2342 |
| | Aldebaran | E. | 38 | 14 | 47 | 2473 | 36 | 32 | 56 | 2495 | 34 | 51 | 36 | 2519 | 33 | 10 | 49 | 2543 |
| | Saturn | E. | 67 | 22 | 38 | 2378 | 65 | 38 | 32 | 2386 | 63 | 54 | 37 | 2394 | 62 | 10 | 53 | 2402 |
| | Sun | E. | 91 | 39 | 13 | 2637 | 90 | 1 | 8 | 2645 | 88 | 23 | 14 | 2652 | 86 | 45 | 30 | 2660 |
| 25 | α Aquilæ | W. | 101 | 17 | 43 | 3247 | 102 | 42 | 57 | 3268 | 104 | 7 | 46 | 3288 | 105 | 32 | 11 | 3312 |
| | Fomalhaut | W. | 74 | 12 | 20 | 2592 | 75 | 51 | 26 | 2596 | 77 | 30 | 26 | 2601 | 79 | 9 | 19 | 2607 |
| | α Pegasi | W. | 54 | 6 | 35 | 2868 | 55 | 39 | 35 | 2855 | 57 | 12 | 51 | 2845 | 58 | 46 | 20 | 2836 |
| | Jupiter | W. | 35 | 0 | 18 | 2378 | 36 | 44 | 24 | 2385 | 38 | 28 | 20 | 2394 | 40 | 12 | 4 | 2401 |
| | Saturn | E. | 53 | 35 | 15 | 2445 | 51 | 52 | 45 | 2455 | 50 | 10 | 28 | 2465 | 48 | 28 | 25 | 2475 |
| | Sun | E. | 78 | 39 | 30 | 2701 | 77 | 2 | 51 | 2709 | 75 | 26 | 23 | 2718 | 73 | 50 | 7 | 2726 |
| 26 | α Aquilæ | W. | 112 | 26 | 55 | 3456 | 113 | 48 | 8 | 3491 | 115 | 8 | 42 | 3528 | 116 | 28 | 35 | 3568 |
| | Fomalhaut | W. | 87 | 21 | 45 | 2640 | 88 | 59 | 46 | 2647 | 90 | 37 | 37 | 2655 | 92 | 15 | 17 | 2664 |
| | α Pegasi | W. | 66 | 35 | 57 | 2814 | 68 | 10 | 7 | 2813 | 69 | 44 | 18 | 2812 | 71 | 18 | 30 | 2813 |
| | Jupiter | W. | 48 | 48 | 7 | 2439 | 50 | 30 | 46 | 2446 | 52 | 13 | 15 | 2455 | 53 | 55 | 32 | 2462 |
| | Saturn | E. | 40 | 1 | 43 | 2528 | 38 | 21 | 9 | 2540 | 36 | 40 | 52 | 2553 | 35 | 0 | 52 | 2566 |
| | Sun | E. | 65 | 51 | 36 | 2770 | 64 | 16 | 29 | 2779 | 62 | 41 | 34 | 2788 | 61 | 6 | 50 | 2798 |
| 27 | Fomalhaut | W. | 100 | 20 | 34 | 2712 | 101 | 56 | 58 | 2723 | 103 | 33 | 7 | 2735 | 105 | 9 | 1 | 2746 |
| | α Pegasi | W. | 79 | 8 | 51 | 2829 | 80 | 42 | 42 | 2834 | 82 | 16 | 26 | 2839 | 83 | 50 | 3 | 2845 |
| | Jupiter | W. | 62 | 24 | 12 | 2502 | 64 | 5 | 23 | 2510 | 65 | 46 | 23 | 2518 | 67 | 27 | 11 | 2527 |
| | Saturn | E. | 26 | 46 | 0 | 2652 | 25 | 8 | 16 | 2675 | 23 | 31 | 2 | 2701 | 21 | 54 | 23 | 2732 |
| | Sun | E. | 53 | 16 | 16 | 2845 | 51 | 42 | 46 | 2855 | 50 | 9 | 29 | 2864 | 48 | 36 | 24 | 2875 |
| 28 | Fomalhaut | W. | 113 | 4 | 28 | 2813 | 114 | 38 | 39 | 2828 | 116 | 12 | 31 | 2844 | 117 | 46 | 2 | 2860 |
| | α Pegasi | W. | 91 | 35 | 55 | 2884 | 93 | 8 | 34 | 2894 | 94 | 41 | 1 | 2904 | 96 | 13 | 15 | 2914 |
| | Sun | E. | 40 | 54 | 22 | 2928 | 39 | 22 | 39 | 2939 | 37 | 51 | 10 | 2952 | 36 | 19 | 57 | 2964 |
| 29 | α Pegasi | W. | 103 | 50 | 53 | 2975 | 105 | 21 | 37 | 2989 | 106 | 52 | 3 | 3004 | 108 | 22 | 11 | 3020 |
| | Sun | E. | 28 | 47 | 53 | 3034 | 27 | 18 | 23 | 3051 | 25 | 49 | 13 | 3068 | 24 | 20 | 24 | 3086 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XV$^{h}$. | P. L. of Diff. | XVIII$^{h}$. | P. L. of Diff. | XXI$^{h}$. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 21 | Antares | W. | 106 25 37 | 2206 | 108 13 56 | 2210 | 110 2 9 | 2213 | 111 50 18 | 2216 |
| | α Aquilæ | W. | 60 54 50 | 3348 | 62 18 6 | 3315 | 63 42 0 | 3284 | 65 6 30 | 3258 |
| | α Arietis | E. | 42 46 47 | 2316 | 41 1 11 | 2327 | 39 15 51 | 2339 | 37 30 49 | 2353 |
| | Aldebaran | E. | 73 14 5 | 2269 | 71 27 20 | 2273 | 69 40 41 | 2278 | 67 54 9 | 2284 |
| | Saturn | E. | 102 37 20 | 2265 | 100 50 29 | 2268 | 99 3 43 | 2272 | 97 17 2 | 2275 |
| | Sun | E. | 124 50 49 | 2527 | 123 10 14 | 2530 | 121 29 43 | 2534 | 119 49 17 | 2537 |
| 22 | Antares | W. | 120 49 24 | 2240 | 122 36 52 | 2245 | 124 24 12 | 2251 | 126 11 24 | 2256 |
| | α Aquilæ | W. | 72 15 50 | 3163 | 73 42 43 | 3152 | 75 9 50 | 3143 | 76 37 8 | 3136 |
| | Fomalhaut | W. | 41 19 0 | 2720 | 42 55 13 | 2695 | 44 32 0 | 2672 | 46 9 17 | 2654 |
| | α Arietis | E. | 28 51 37 | 2465 | 27 9 34 | 2502 | 25 28 23 | 2544 | 23 48 11 | 2592 |
| | Aldebaran | E. | 59 3 50 | 2318 | 57 18 17 | 2327 | 55 32 57 | 2337 | 53 47 51 | 2347 |
| | Saturn | E. | 88 25 6 | 2298 | 86 39 4 | 2304 | 84 53 10 | 2310 | 83 7 25 | 2315 |
| | Sun | E. | 111 28 23 | 2559 | 109 48 31 | 2564 | 108 8 47 | 2571 | 106 29 12 | 2576 |
| 23 | α Aquilæ | W. | 83 55 5 | 3122 | 85 22 48 | 3125 | 86 50 27 | 3130 | 88 18 0 | 3135 |
| | Fomalhaut | W. | 54 20 54 | 2596 | 55 59 54 | 2591 | 57 39 2 | 2585 | 59 18 17 | 2582 |
| | Aldebaran | E. | 45 6 17 | 2407 | 43 22 52 | 2421 | 41 39 47 | 2437 | 39 57 5 | 2454 |
| | Saturn | E. | 74 20 53 | 2348 | 72 36 4 | 2355 | 70 51 25 | 2362 | 69 6 56 | 2370 |
| | Sun | E. | 98 13 13 | 2607 | 96 34 28 | 2615 | 94 55 53 | 2622 | 93 17 28 | 2629 |
| 24 | α Aquilæ | W. | 95 33 33 | 3183 | 97 0 2 | 3198 | 98 26 14 | 3213 | 99 52 8 | 3228 |
| | Fomalhaut | W. | 67 35 12 | 2580 | 69 14 34 | 2583 | 70 53 53 | 2585 | 72 33 9 | 2588 |
| | α Pegasi | W. | 47 58 16 | 2943 | 49 29 40 | 2920 | 51 1 34 | 2899 | 52 33 52 | 2883 |
| | Jupiter | W. | 28 2 6 | 2848 | 29 46 55 | 2856 | 31 31 33 | 2863 | 33 16 1 | 2871 |
| | Aldebaran | E. | 31 30 36 | 2572 | 29 51 2 | 2604 | 28 12 12 | 2642 | 26 34 14 | 2687 |
| | Saturn | E. | 60 27 21 | 2410 | 58 44 1 | 2419 | 57 0 53 | 2428 | 55 17 58 | 2436 |
| | Sun | E. | 85 7 57 | 2668 | 83 30 34 | 2675 | 81 53 21 | 2684 | 80 16 19 | 2693 |
| 25 | α Aquilæ | W. | 106 56 9 | 3336 | 108 19 39 | 3363 | 109 42 38 | 3392 | 111 5 4 | 3423 |
| | Fomalhaut | W. | 80 48 5 | 2612 | 82 26 43 | 2618 | 84 5 13 | 2625 | 85 43 34 | 2632 |
| | α Pegasi | W. | 60 20 1 | 2829 | 61 53 51 | 2824 | 63 27 48 | 2820 | 65 1 50 | 2816 |
| | Jupiter | W. | 41 55 38 | 2408 | 43 39 1 | 2415 | 45 22 14 | 2423 | 47 5 16 | 2431 |
| | Saturn | E. | 46 46 36 | 2485 | 45 5 1 | 2494 | 43 23 40 | 2505 | 41 42 34 | 2516 |
| | Sun | E. | 72 14 2 | 2735 | 70 38 8 | 2744 | 69 2 26 | 2752 | 67 26 55 | 2761 |
| 26 | α Aquilæ | W. | 117 47 44 | 3612 | 119 6 5 | 3661 | 120 23 34 | 3712 | 121 40 8 | 3765 |
| | Fomalhaut | W. | 93 52 45 | 2673 | 95 30 1 | 2682 | 97 7 5 | 2692 | 98 43 56 | 2701 |
| | α Pegasi | W. | 72 52 41 | 2815 | 74 26 49 | 2818 | 76 0 54 | 2821 | 77 34 55 | 2825 |
| | Jupiter | W. | 55 37 38 | 2470 | 57 19 33 | 2478 | 59 1 17 | 2486 | 60 42 50 | 2494 |
| | Saturn | E. | 33 21 11 | 2580 | 31 41 49 | 2596 | 30 2 49 | 2613 | 28 24 12 | 2632 |
| | Sun | E. | 59 32 19 | 2807 | 57 58 0 | 2816 | 56 23 53 | 2825 | 54 49 58 | 2835 |
| 27 | Fomalhaut | W. | 106 44 40 | 2758 | 108 20 3 | 2771 | 109 55 9 | 2784 | 111 29 58 | 2798 |
| | α Pegasi | W. | 85 23 32 | 2852 | 86 56 52 | 2859 | 88 30 3 | 2867 | 90 3 4 | 2875 |
| | Jupiter | W. | 69 7 47 | 2535 | 70 48 12 | 2543 | 72 28 26 | 2551 | 74 8 28 | 2559 |
| | Saturn | E. | 20 18 26 | 2769 | 18 43 18 | 2815 | 17 9 9 | 2871 | 15 36 13 | 2944 |
| | Sun | E. | 47 3 33 | 2885 | 45 30 55 | 2895 | 43 58 30 | 2906 | 42 26 19 | 2917 |
| 28 | Fomalhaut | W. | 119 19 12 | 2877 | 120 52 0 | 2896 | 122 24 24 | 2915 | 123 56 24 | 2935 |
| | α Pegasi | W. | 97 45 16 | 2925 | 99 17 3 | 2937 | 100 48 35 | 2949 | 102 19 52 | 2962 |
| | Sun | E. | 34 48 59 | 2977 | 33 18 17 | 2989 | 31 47 51 | 3004 | 30 17 43 | 3018 |
| 29 | α Pegasi | W. | 109 51 59 | 3036 | 111 21 27 | 3053 | 112 50 34 | 3071 | 114 19 19 | 3089 |
| | Sun | E. | 22 52 0 | 3110 | 21 24 3 | 3135 | 19 56 36 | 3163 | 18 29 43 | 3194 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S Apparent Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S Apparent Declination. | THE SUN'S Diff. for 1 hour. | THE SUN'S Semi-diameter. | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, to be *added to* / *subtracted from* Apparent Time. | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | ″ | s. | m. s. | s. |
| Fri. | 1 | 8 47 8.59 | 9.705 | N.17 55 53.7 | 38.10 | 15 48.09 | 66.60 | 6 0.88 | 0.151 |
| Sat. | 2 | 8 51 1.19 | 9.680 | 17 40 30.4 | 38.84 | 15 48.22 | 66.51 | 5 56.94 | 0.177 |
| *Sun.* | 3 | 8 54 53.18 | 9.654 | 17 24 49.8 | 39.54 | 15 48.35 | 66.42 | 5 52.39 | 0.204 |
| Mon. | 4 | 8 58 44.56 | 9.629 | 17 8 52.2 | 40.25 | 15 48.49 | 66.34 | 5 47.21 | 0.228 |
| Tues. | 5 | 9 2 35.34 | 9.603 | 16 52 37.7 | 40.93 | 15 48.65 | 66.25 | 5 41.46 | 0.253 |
| Wed. | 6 | 9 6 25.51 | 9.578 | 16 36 7.1 | 41.61 | 15 49.80 | 66.17 | 5 35.09 | 0.278 |
| Thur. | 7 | 9 10 15.06 | 9.553 | 16 19 20.6 | 42.26 | 15 48.96 | 66.09 | 5 28.09 | 0.304 |
| Fri. | 8 | 9 14 3.98 | 9.527 | 16 2 18.4 | 42.91 | 15 49.12 | 66.01 | 5 20.48 | 0.329 |
| Sat. | 9 | 9 17 52.33 | 9.502 | 15 45 0.6 | 43.54 | 15 49.29 | 65.92 | 5 12.30 | 0.354 |
| *Sun.* | 10 | 9 21 40.08 | 9.478 | 15 27 27.9 | 44.17 | 15 49.47 | 65.84 | 5 3.51 | 0.378 |
| Mon. | 11 | 9 25 27.22 | 9.454 | 15 9 40.6 | 44.77 | 15 49.65 | 65.76 | 4 54.13 | 0.402 |
| Tues. | 12 | 9 29 13.83 | 9.430 | 14 51 38.6 | 45.37 | 15 49.82 | 65.68 | 4 44.21 | 0.427 |
| Wed. | 13 | 9 32 59.84 | 9.407 | 14 33 22.6 | 45.95 | 15 49.99 | 65.60 | 4 33.70 | 0.450 |
| Thur. | 14 | 9 36 45.31 | 9.384 | 14 14 52.7 | 46.54 | 15 50.16 | 65.52 | 4 22.64 | 0.473 |
| Fri. | 15 | 9 40 30.24 | 9.362 | 13 56 9.2 | 47.08 | 15 50.34 | 65.45 | 4 11.05 | 0.495 |
| Sat. | 16 | 9 44 14.62 | 9.341 | 13 37 12.5 | 47.63 | 15 50.53 | 65.37 | 3 58.90 | 0.517 |
| *Sun.* | 17 | 9 47 58.51 | 9.320 | 13 18 2.9 | 48.16 | 15 50.71 | 65.30 | 3 46.27 | 0.538 |
| Mon. | 18 | 9 51 41.89 | 9.299 | 12 58 40.7 | 48.70 | 15 50.90 | 65.23 | 3 33.12 | 0.557 |
| Tues. | 19 | 9 55 24.79 | 9.279 | 12 39 6.0 | 49.20 | 15 51.09 | 65.15 | 3 19.50 | 0.577 |
| Wed. | 20 | 9 59 7.22 | 9.259 | 12 19 19.0 | 49.71 | 15 51.28 | 65.08 | 3 5.42 | 0.597 |
| Thur. | 21 | 10 2 49.18 | 9.240 | 11 59 20.4 | 50.18 | 15 51.49 | 65.01 | 2 50.87 | 0.616 |
| Fri. | 22 | 10 6 30.69 | 9.223 | 11 39 10.2 | 50.66 | 15 51.70 | 64.94 | 2 35.86 | 0.635 |
| Sat. | 23 | 10 10 11.78 | 9.205 | 11 18 48.9 | 51.11 | 15 51.90 | 64.87 | 2 20.44 | 0.652 |
| *Sun.* | 24 | 10 13 52.47 | 9.188 | 10 58 16.6 | 51.57 | 15 52.11 | 64.81 | 2 4.62 | 0.669 |
| Mon. | 25 | 10 17 32.76 | 9.172 | 10 37 33.8 | 52.00 | 15 52.32 | 64.75 | 1 48.40 | 0.686 |
| Tues. | 26 | 10 21 12.66 | 9.157 | 10 16 40.7 | 52.43 | 15 52.52 | 64.69 | 1 31.78 | 0.702 |
| Wed. | 27 | 10 24 52.20 | 9.142 | 9 55 37.6 | 52.82 | 15 52.73 | 64.64 | 1 14.82 | 0.717 |
| Thur. | 28 | 10 28 31.38 | 9.127 | 9 34 25.0 | 53.22 | 15 52.94 | 64.60 | 0 57.49 | 0.730 |
| Fri. | 29 | 10 32 10.21 | 9.113 | 9 13 3.1 | 53.59 | 15 53.16 | 64.54 | 0 39.82 | 0.744 |
| Sat. | 30 | 10 35 48.70 | 9.099 | 8 51 32.3 | 53.97 | 15 53.39 | 64.50 | 0 21.81 | 0.758 |
| *Sun.* | 31 | 10 39 26.87 | 9.086 | 8 29 53.0 | 54.31 | 15 53.61 | 64.45 | 0 3.48 | 0.771 |
| Mon. | 32 | 10 43 4.75 | 9.074 | N. 8 8 5.5 | 54.66 | 15 53.85 | 64.40 | 0 15.14 | 0.783 |

**Note.** — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Equation of Time, *to be subtracted from* / *added to* *Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Fri. | 1 | 8 47 7.63 | 9.703 | N.17 55 57.4 | 38.10 | 6 0.89 | 0.151 | 8 41 6.74 |
| Sat. | 2 | 8 51 0.24 | 9.680 | 17 40 34.2 | 38.84 | 5 56.95 | 0.177 | 8 45 3.29 |
| *Sun.* | 3 | 8 54 52.25 | 9.654 | 17 24 53.6 | 39.54 | 5 52.40 | 0.204 | 8 48 59.85 |
| Mon. | 4 | 8 58 43.64 | 9.629 | 17 8 56.0 | 40.25 | 5 47.28 | 0.228 | 8 52 56.41 |
| Tues. | 5 | 9 2 34.44 | 9.603 | 16 52 41.6 | 40.93 | 5 41.48 | 0.253 | 8 56 52.96 |
| Wed. | 6 | 9 6 24.63 | 9.578 | 16 36 11.0 | 41.61 | 5 35.11 | 0.278 | 9 0 49.52 |
| Thur. | 7 | 9 10 14.19 | 9.553 | 16 19 24.5 | 42.26 | 5 28.11 | 0.304 | 9 4 46.08 |
| Fri. | 8 | 9 14 3.13 | 9.527 | 16 2 22.2 | 42.91 | 5 20.50 | 0.329 | 9 8 42.63 |
| Sat. | 9 | 9 17 51.51 | 9.502 | 15 45 4.4 | 43.54 | 5 12.32 | 0.354 | 9 12 39.19 |
| *Sun.* | 10 | 9 21 39.28 | 9.478 | 15 27 31.6 | 44.17 | 5 3.53 | 0.378 | 9 16 35.75 |
| Mon. | 11 | 9 25 26.45 | 9.454 | 15 9 44.2 | 44.77 | 4 54.15 | 0.402 | 9 20 32.30 |
| Tues. | 12 | 9 29 13.09 | 9.430 | 14 51 42.2 | 45.37 | 4 44.23 | 0.427 | 9 24 28.86 |
| Wed. | 13 | 9 32 59.13 | 9.407 | 14 33 26.1 | 45.95 | 4 33.72 | 0.450 | 9 28 25.41 |
| Thur. | 14 | 9 36 44.63 | 9.384 | 14 14 56.1 | 46.54 | 4 22.66 | 0.473 | 9 32 21.97 |
| Fri. | 15 | 9 40 29.59 | 9.362 | 13 56 12.4 | 47.08 | 4 11.07 | 0.495 | 9 36 18.52 |
| Sat. | 16 | 9 44 14.00 | 9.341 | 13 37 15.6 | 47.63 | 3 58.92 | 0.517 | 9 40 15.08 |
| *Sun.* | 17 | 9 47 57.92 | 9.320 | 13 18 5.9 | 48.16 | 3 46.29 | 0.538 | 9 44 11.63 |
| Mon. | 18 | 9 51 41.33 | 9.299 | 12 58 43.5 | 48.70 | 3 33.14 | 0.557 | 9 48 8.19 |
| Tues. | 19 | 9 55 24.27 | 9.279 | 12 39 8.6 | 49.20 | 3 19.52 | 0.577 | 9 52 4.75 |
| Wed. | 20 | 9 59 6.74 | 9.259 | 12 19 21.5 | 49.71 | 3 5.44 | 0.597 | 9 56 1.30 |
| Thur. | 21 | 10 2 48.74 | 9.240 | 11 59 22.7 | 50.18 | 2 50.89 | 0.616 | 9 59 57.85 |
| Fri. | 22 | 10 6 30.29 | 9.223 | 11 39 12.4 | 50.66 | 2 35.88 | 0.635 | 10 3 54.41 |
| Sat. | 23 | 10 10 11.42 | 9.205 | 11 18 50.9 | 51.11 | 2 20.46 | 0.652 | 10 7 50.96 |
| *Sun.* | 24 | 10 13 52.15 | 9.188 | 10 58 18.4 | 51.57 | 2 4.63 | 0.669 | 10 11 47.52 |
| Mon. | 25 | 10 17 32.48 | 9.172 | 10 37 35.4 | 52.00 | 1 48.41 | 0.686 | 10 15 44.07 |
| Tues. | 26 | 10 21 12.42 | 9.157 | 10 16 42.1 | 52.43 | 1 31.79 | 0.702 | 10 19 40.63 |
| Wed. | 27 | 10 24 52.01 | 9.142 | 9 55 38.8 | 52.82 | 1 14.83 | 0.717 | 10 23 37.18 |
| Thur. | 28 | 10 28 31.23 | 9.127 | 9 34 26.0 | 53.22 | 0 57.49 | 0.730 | 10 27 33.74 |
| Fri. | 29 | 10 32 10.11 | 9.113 | 9 13 3.8 | 53.59 | 0 39.82 | 0.744 | 10 31 30.29 |
| Sat. | 30 | 10 35 48.65 | 9.099 | 8 51 32.7 | 53.97 | 0 21.80 | 0.758 | 10 35 26.85 |
| *Sun.* | 31 | 10 39 26.87 | 9.086 | 8 29 53.1 | 54.31 | 0 3.47 | 0.771 | 10 39 23.40 |
| Mon. | 32 | 10 43 4.79 | 9.074 | N. 8 8 5.3 | 54.66 | 0 15.16 | 0.783 | 10 43 19.95 |

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 214 | 129 20 45.6 | 20 20.4 | 143.64 | +0.49 | 0.0063282 | 24.9 | 15 16 22.73 |
| 2 | 215 | 130 18 13.6 | 17 48.3 | 143.68 | 0.42 | .0062672 | 25.9 | 15 12 26.82 |
| 3 | 216 | 131 15 42.6 | 15 17.2 | 143.73 | 0.33 | .0062038 | 26.9 | 15 8 30.91 |
| 4 | 217 | 132 13 12.5 | 12 46.9 | 143.77 | 0.23 | .0061381 | 27.8 | 15 4 34.99 |
| 5 | 218 | 133 10 43.2 | 10 17.5 | 143.80 | +0.10 | .0060701 | 28.7 | 15 0 39.08 |
| 6 | 219 | 134 8 14.7 | 7 48.8 | 143.84 | —0.02 | .0059998 | 29.5 | 14 56 43.17 |
| 7 | 220 | 135 5 47.0 | 5 20.9 | 143.88 | 0.15 | .0059276 | 30.3 | 14 52 47.26 |
| 8 | 221 | 136 3 20.1 | 2 53.9 | 143.91 | 0.27 | .0058537 | 31.2 | 14 48 51.35 |
| 9 | 222 | 137 0 54.2 | 0 27.8 | 143.95 | 0.38 | .0057780 | 31.8 | 14 44 55.44 |
| 10 | 223 | 137 58 29.2 | 8 2.7 | 144.00 | 0.46 | .0057006 | 32.4 | 14 40 59.53 |
| 11 | 224 | 138 56 5.0 | 55 38.4 | 144.04 | 0.53 | .0056218 | 33.0 | 14 37 3.62 |
| 12 | 225 | 139 53 41.8 | 53 15.0 | 144.07 | 0.57 | .0055418 | 33.6 | 14 33 7.71 |
| 13 | 226 | 140 51 19.7 | 50 52.8 | 144.11 | 0.59 | .0054605 | 34.1 | 14 29 11.80 |
| 14 | 227 | 141 48 58.7 | 48 31.7 | 144.16 | 0.57 | .0053780 | 34.5 | 14 25 15.89 |
| 15 | 228 | 142 46 38.9 | 46 11.7 | 144.21 | 0.53 | .0052947 | 34.9 | 14 21 19.99 |
| 16 | 229 | 143 44 20.3 | 43 52.9 | 144.26 | 0.44 | .0052106 | 35.3 | 14 17 24.07 |
| 17 | 230 | 144 42 3.1 | 41 35.6 | 144.32 | 0.33 | .0051255 | 35.8 | 14 13 28.16 |
| 18 | 231 | 145 39 47.3 | 39 19.7 | 144.37 | 0.20 | .0050394 | 36.1 | 14 9 32.25 |
| 19 | 232 | 146 37 33.2 | 37 5.5 | 144.44 | —0.07 | .0049522 | 36.6 | 14 5 36.34 |
| 20 | 233 | 147 35 20.7 | 34 52.9 | 144.51 | +0.07 | .0048639 | 37.1 | 14 1 40.45 |
| 21 | 234 | 148 33 9.9 | 32 42.0 | 144.58 | 0.19 | .0047748 | 37.5 | 13 57 44.53 |
| 22 | 235 | 149 31 0.8 | 30 32.7 | 144.65 | 0.32 | .0046844 | 38.0 | 13 53 48.62 |
| 23 | 236 | 150 28 53.5 | 28 25.3 | 144.73 | 0.43 | .0045929 | 38.4 | 13 49 52.71 |
| 24 | 237 | 151 26 48.0 | 26 19.6 | 144.81 | 0.52 | .0045000 | 39.0 | 13 45 56.80 |
| 25 | 238 | 152 24 44.3 | 24 15.8 | 144.88 | 0.59 | .0044056 | 39.6 | 13 42 0.89 |
| 26 | 239 | 153 22 42.5 | 22 13.9 | 144.95 | 0.61 | .0043096 | 40.3 | 13 38 4.98 |
| 27 | 240 | 154 20 42.5 | 20 13.7 | 145.02 | 0.62 | .0042119 | 41.0 | 13 34 9.07 |
| 28 | 241 | 155 18 44.3 | 18 15.4 | 145.10 | 0.60 | .0041125 | 41.8 | 13 30 13.16 |
| 29 | 242 | 156 16 47.9 | 16 18.8 | 145.17 | 0.53 | .0040114 | 2.5 | 13 26 17.25 |
| 30 | 243 | 157 14 53.3 | 14 24.1 | 145.24 | 0.45 | .0039084 | 3.2 | 13 22 31.35 |
| 31 | 244 | 158 13 0.3 | 12 31.0 | 145.31 | 0.35 | .0038037 | 4.0 | 13 18 25.44 |
| 32 | 245 | 159 11 8.9 | 10 39.5 | 145.39 | +0.23 | 0.0036972 | 4.7 | 13 14 29.53 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

GREENWICH MEAN TIME.

THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 15 6.7 | 15 3.0 | 55 20.8 | −1.15 | 55 7.3 | −1.08 | 0 41.8 | 1.97 | 0.6 |
| 2 | 14 59.6 | 14 56.5 | 54 54.8 | 1.00 | 54 43.4 | 0.90 | 1 27.2 | 1.82 | 1.6 |
| 3 | 14 53.7 | 14 51.3 | 54 33.2 | 0.79 | 54 24.4 | 0.66 | 2 9.3 | 1.71 | 2.6 |
| 4 | 14 49.4 | 14 47.9 | 54 17.3 | 0.52 | 54 12.0 | 0.36 | 2 49.3 | 1.63 | 3.6 |
| 5 | 14 47.0 | 14 46.7 | 54 8.6 | −0.19 | 54 7.3 | −0.01 | 3 28.2 | 1.60 | 4.6 |
| 6 | 14 46.9 | 14 47.8 | 54 8.3 | +0.18 | 54 11.7 | +0.39 | 4 7.2 | 1.63 | 5.6 |
| 7 | 14 49.4 | 14 51.7 | 54 17.6 | 0.60 | 54 26.0 | 0.81 | 4 47.4 | 1.72 | 6.6 |
| 8 | 14 54.7 | 14 58.4 | 54 37.0 | 1.02 | 54 50.5 | 1.22 | 5 30.1 | 1.84 | 7.6 |
| 9 | 15 2.7 | 15 7.7 | 55 6.4 | 1.42 | 55 24.6 | 1.60 | 6 16.2 | 1.99 | 8.6 |
| 10 | 15 13.2 | 15 19.3 | 55 44.9 | 1.77 | 56 7.1 | 1.92 | 7 6.5 | 2.17 | 9.6 |
| 11 | 15 25.8 | 15 32.7 | 56 31.0 | 2.05 | 56 56.3 | 2.15 | 8 1.2 | 2.36 | 10.6 |
| 12 | 15 39.8 | 15 47.0 | 57 22.5 | 2.21 | 57 49.1 | 2.22 | 8 59.6 | 2.50 | 11.6 |
| 13 | 15 54.2 | 16 1.3 | 58 15.7 | 2.19 | 58 41.6 | 2.11 | 9 59.8 | 2.52 | 12.6 |
| 14 | 16 8.1 | 16 14.3 | 59 6.3 | 1.98 | 59 29.2 | 1.81 | 10 59.3 | 2.44 | 13.6 |
| 15 | 16 19.9 | 16 24.7 | 59 49.7 | 1.59 | 60 7.3 | 1.32 | 11 56.4 | 2.31 | 14.6 |
| 16 | 16 28.6 | 16 31.5 | 60 21.5 | 1.03 | 60 32.1 | 0.72 | 12 50.7 | 2.21 | 15.6 |
| 17 | 16 33.3 | 16 34.0 | 60 38.8 | +0.39 | 60 41.5 | +0.06 | 13 42.5 | 2.12 | 16.6 |
| 18 | 16 33.6 | 16 32.2 | 60 40.2 | −0.27 | 60 35.1 | −0.58 | 14 32.7 | 2.07 | 17.6 |
| 19 | 16 29.9 | 16 26.7 | 60 26.5 | 0.85 | 60 14.8 | 1.08 | 15 22.6 | 2.09 | 18.6 |
| 20 | 16 22.8 | 16 18.4 | 60 0.5 | 1.28 | 59 44.1 | 1.44 | 16 13.6 | 2.16 | 19.6 |
| 21 | 16 13.5 | 16 8.2 | 59 26.0 | 1.56 | 59 6.7 | 1.64 | 17 6.7 | 2.25 | 20.6 |
| 22 | 16 2.7 | 15 57.2 | 58 46.7 | 1.68 | 58 26.3 | 1.70 | 18 2.1 | 2.35 | 21.6 |
| 23 | 15 51.6 | 15 46.1 | 58 5.9 | 1.69 | 57 45.7 | 1.66 | 18 59.5 | 2.42 | 22.6 |
| 24 | 15 40.8 | 15 35.6 | 57 26.0 | 1.62 | 57 6.9 | 1.57 | 19 57.5 | 2.40 | 23.6 |
| 25 | 15 30.5 | 15 25.7 | 56 48.4 | 1.51 | 56 30.7 | 1.44 | 20 54.1 | 2.31 | 24.6 |
| 26 | 15 21.1 | 15 16.7 | 56 13.8 | 1.37 | 55 57.7 | 1.31 | 21 47.8 | 2.17 | 25.6 |
| 27 | 15 12.5 | 15 8.6 | 55 42.4 | 1.24 | 55 28.0 | 1.16 | 22 37.8 | 2.00 | 26.6 |
| 28 | 15 4.9 | 15 1.5 | 55 14.5 | 1.09 | 55 1.9 | 1.01 | 23 23.9 | 1.84 | 27.6 |
| 29 | 14 58.3 | 14 55.4 | 54 50.2 | 0.93 | 54 39.5 | 0.84 | ☌ | | 28.6 |
| 30 | 14 52.8 | 14 50.5 | 54 29.9 | 0.75 | 54 21.4 | 0.65 | 0 6.7 | 1.72 | 0.0 |
| 31 | 14 48.5 | 14 46.8 | 54 14.1 | 0.55 | 54 8.1 | 0.44 | 0 47.2 | 1.65 | 1.0 |
| 32 | 14 45.6 | 14 44.9 | 54 3.6 | −0.31 | 54 0.6 | −0.18 | 1 26.4 | 1.62 | 2.0 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 21 33.51 | 2.0725 | N.20 6 50.0 | 10.816 |
| 1 | 9 23 37.67 | 2.0663 | 19 55 58.5 | 10.899 |
| 2 | 9 25 41.46 | 2.0601 | 19 45 2.1 | 10.981 |
| 3 | 9 27 44.88 | 2.0539 | 19 34 0.8 | 11.062 |
| 4 | 9 29 47.93 | 2.0478 | 19 22 54.7 | 11.142 |
| 5 | 9 31 50.62 | 2.0418 | 19 11 43.8 | 11.221 |
| 6 | 9 33 52.95 | 2.0357 | 19 0 28.2 | 11.298 |
| 7 | 9 35 54.91 | 2.0297 | 18 49 8.1 | 11.373 |
| 8 | 9 37 56.51 | 2.0237 | 18 37 43.5 | 11.447 |
| 9 | 9 39 57.76 | 2.0178 | 18 26 14.5 | 11.520 |
| 10 | 9 41 58.65 | 2.0119 | 18 14 41.1 | 11.592 |
| 11 | 9 43 59.19 | 2.0061 | 18 3 3.5 | 11.662 |
| 12 | 9 45 59.39 | 2.0003 | 17 51 21.7 | 11.731 |
| 13 | 9 47 59.24 | 1.9946 | 17 39 35.8 | 11.799 |
| 14 | 9 49 58.74 | 1.9889 | 17 27 45.8 | 11.866 |
| 15 | 9 51 57.90 | 1.9832 | 17 15 51.8 | 11.932 |
| 16 | 9 53 56.72 | 1.9776 | 17 3 53.9 | 11.997 |
| 17 | 9 55 55.21 | 1.9721 | 16 51 52.2 | 12.060 |
| 18 | 9 57 53.37 | 1.9667 | 16 39 46.7 | 12.122 |
| 19 | 9 59 51.21 | 1.9613 | 16 27 37.5 | 12.183 |
| 20 | 10 1 48.72 | 1.9559 | 16 15 24.7 | 12.243 |
| 21 | 10 3 45.90 | 1.9505 | 16 3 8.3 | 12.303 |
| 22 | 10 5 42.76 | 1.9452 | 15 50 48.3 | 12.361 |
| 23 | 10 7 39.31 | 1.9399 | N.15 38 24.9 | 12.418 |

### SATURDAY 2.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 10 9 35.55 | 1.9347 | N.15 25 58.1 | 12.474 |
| 1 | 10 11 31.48 | 1.9296 | 15 13 28.0 | 12.529 |
| 2 | 10 13 27.10 | 1.9246 | 15 0 54.7 | 12.582 |
| 3 | 10 15 22.42 | 1.9196 | 14 48 18.2 | 12.634 |
| 4 | 10 17 17.44 | 1.9146 | 14 35 38.6 | 12.685 |
| 5 | 10 19 12.17 | 1.9097 | 14 22 56.0 | 12.735 |
| 6 | 10 21 6.61 | 1.9049 | 14 10 10.4 | 12.785 |
| 7 | 10 23 0.76 | 1.9001 | 13 57 21.8 | 12.833 |
| 8 | 10 24 54.62 | 1.8953 | 13 44 30.4 | 12.880 |
| 9 | 10 26 48.20 | 1.8907 | 13 31 36.2 | 12.926 |
| 10 | 10 28 41.51 | 1.8862 | 13 18 39.3 | 12.971 |
| 11 | 10 30 34.55 | 1.8817 | 13 5 39.7 | 13.015 |
| 12 | 10 32 27.32 | 1.8773 | 12 52 37.5 | 13.058 |
| 13 | 10 34 19.83 | 1.8730 | 12 39 32.8 | 13.100 |
| 14 | 10 36 12.08 | 1.8687 | 12 26 25.6 | 13.141 |
| 15 | 10 38 4.07 | 1.8644 | 12 13 15.9 | 13.182 |
| 16 | 10 39 55.81 | 1.8602 | 12 0 3.8 | 13.221 |
| 17 | 10 41 47.30 | 1.8561 | 11 46 49.4 | 13.259 |
| 18 | 10 43 38.54 | 1.8520 | 11 33 32.7 | 13.297 |
| 19 | 10 45 29.54 | 1.8480 | 11 20 13.8 | 13.333 |
| 20 | 10 47 20.30 | 1.8441 | 11 6 52.8 | 13.367 |
| 21 | 10 49 10.83 | 1.8403 | 10 53 29.8 | 13.400 |
| 22 | 10 51 1.13 | 1.8366 | 10 40 4.8 | 13.433 |
| 23 | 10 52 51.21 | 1.8328 | 10 26 37.8 | 13.466 |
| 24 | 10 54 41.07 | 1.8292 | N.10 13 8.9 | 13.498 |

### SUNDAY 3.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 54 41.07 | 1.8292 | N.10 13 8.9 | 13.498 |
| 1 | 10 56 30.72 | 1.8257 | 9 59 38.1 | 13.529 |
| 2 | 10 58 20.15 | 1.8221 | 9 46 5.4 | 13.559 |
| 3 | 11 0 9.37 | 1.8186 | 9 32 30.9 | 13.588 |
| 4 | 11 1 58.38 | 1.8152 | 9 18 54.8 | 13.616 |
| 5 | 11 3 47.19 | 1.8119 | 9 5 17.0 | 13.643 |
| 6 | 11 5 35.81 | 1.8087 | 8 51 37.6 | 13.669 |
| 7 | 11 7 24.24 | 1.8056 | 8 37 56.7 | 13.694 |
| 8 | 11 9 12.48 | 1.8024 | 8 24 14.3 | 13.719 |
| 9 | 11 11 0.53 | 1.7993 | 8 10 30.4 | 13.743 |
| 10 | 11 12 48.40 | 1.7964 | 7 56 45.1 | 13.766 |
| 11 | 11 14 36.10 | 1.7936 | 7 42 58.5 | 13.788 |
| 12 | 11 16 23.63 | 1.7908 | 7 29 10.6 | 13.809 |
| 13 | 11 18 10.99 | 1.7880 | 7 15 21.4 | 13.830 |
| 14 | 11 19 58.19 | 1.7854 | 7 1 31.0 | 13.849 |
| 15 | 11 21 45.24 | 1.7829 | 6 47 39.5 | 13.867 |
| 16 | 11 23 32.14 | 1.7804 | 6 33 46.9 | 13.885 |
| 17 | 11 25 18.89 | 1.7779 | 6 19 53.3 | 13.902 |
| 18 | 11 27 5.49 | 1.7755 | 6 5 58.7 | 13.919 |
| 19 | 11 28 51.95 | 1.7732 | 5 52 3.1 | 13.935 |
| 20 | 11 30 38.28 | 1.7710 | 5 38 6.5 | 13.950 |
| 21 | 11 32 24.48 | 1.7689 | 5 24 9.0 | 13.964 |
| 22 | 11 34 10.55 | 1.7667 | 5 10 10.7 | 13.977 |
| 23 | 11 35 56.49 | 1.7647 | N. 4 56 11.7 | 13.989 |

### MONDAY 4.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 37 42.31 | 1.7627 | N. 4 42 12.0 | 14.001 |
| 1 | 11 39 28.02 | 1.7608 | 4 28 11.6 | 14.012 |
| 2 | 11 41 13.62 | 1.7592 | 4 14 10.6 | 14.020 |
| 3 | 11 42 59.12 | 1.7577 | 4 0 9.1 | 14.029 |
| 4 | 11 44 44.52 | 1.7558 | 3 46 7.1 | 14.038 |
| 5 | 11 46 29.82 | 1.7542 | 3 32 4.6 | 14.046 |
| 6 | 11 48 15.03 | 1.7527 | 3 18 1.6 | 14.053 |
| 7 | 11 50 0.15 | 1.7512 | 3 3 58.2 | 14.059 |
| 8 | 11 51 45.18 | 1.7498 | 2 49 54.5 | 14.064 |
| 9 | 11 53 30.13 | 1.7486 | 2 35 50.5 | 14.069 |
| 10 | 11 55 15.01 | 1.7474 | 2 21 46.2 | 14.074 |
| 11 | 11 56 59.82 | 1.7462 | 2 7 41.6 | 14.078 |
| 12 | 11 58 44.56 | 1.7452 | 1 53 36.8 | 14.081 |
| 13 | 12 0 29.24 | 1.7442 | 1 39 31.8 | 14.084 |
| 14 | 12 2 13.86 | 1.7433 | 1 25 26.7 | 14.086 |
| 15 | 12 3 58.43 | 1.7425 | 1 11 21.5 | 14.087 |
| 16 | 12 5 42.95 | 1.7418 | 0 57 16.2 | 14.087 |
| 17 | 12 7 27.43 | 1.7411 | 0 43 11.0 | 14.086 |
| 18 | 12 9 11.88 | 1.7405 | 0 29 5.9 | 14.084 |
| 19 | 12 10 56.29 | 1.7399 | 0 15 0.9 | 14.082 |
| 20 | 12 12 40.67 | 1.7395 | N. 0 0 56.0 | 14.080 |
| 21 | 12 14 25.03 | 1.7391 | S. 0 13 8.7 | 14.077 |
| 22 | 12 16 9.36 | 1.7387 | 0 27 13.2 | 14.074 |
| 23 | 12 17 53.68 | 1.7384 | 0 41 17.4 | 14.068 |
| 24 | 12 19 37.98 | 1.7382 | S. 0 55 21.3 | 14.062 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### TUESDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 19 37.98 | 1.7382 | S. 0 55 21.3 | 14.062 |
| 1 | 12 21 22.27 | 1.7382 | 1 9 24.8 | 14.056 |
| 2 | 12 23 6.56 | 1.7382 | 1 23 27.9 | 14.050 |
| 3 | 12 24 50.86 | 1.7383 | 1 37 30.7 | 14.042 |
| 4 | 12 26 35.16 | 1.7383 | 1 51 33.0 | 14.033 |
| 5 | 12 28 19.46 | 1.7386 | 2 5 34.7 | 14.023 |
| 6 | 12 30 3.78 | 1.7389 | 2 19 35.8 | 14.013 |
| 7 | 12 31 48.13 | 1.7393 | 2 33 36.3 | 14.003 |
| 8 | 12 33 32.50 | 1.7397 | 2 47 36.2 | 13.993 |
| 9 | 12 35 16.89 | 1.7402 | 3 1 35.5 | 13.982 |
| 10 | 12 37 1.32 | 1.7408 | 3 15 34.1 | 13.971 |
| 11 | 12 38 45.79 | 1.7414 | 3 29 32.0 | 13.958 |
| 12 | 12 40 30.29 | 1.7421 | 3 43 29.1 | 13.944 |
| 13 | 12 42 14.83 | 1.7429 | 3 57 25.3 | 13.929 |
| 14 | 12 43 59.43 | 1.7436 | 4 11 20.6 | 13.914 |
| 15 | 12 45 44.09 | 1.7446 | 4 25 15.0 | 13.899 |
| 16 | 12 47 28.81 | 1.7456 | 4 39 8.5 | 13.884 |
| 17 | 12 49 13.59 | 1.7469 | 4 53 1.0 | 13.867 |
| 18 | 12 50 58.44 | 1.7480 | 5 6 52.5 | 13.849 |
| 19 | 12 52 43.36 | 1.7492 | 5 20 42.9 | 13.830 |
| 20 | 12 54 28.35 | 1.7506 | 5 34 32.1 | 13.811 |
| 21 | 12 56 13.42 | 1.7519 | 5 48 20.2 | 13.791 |
| 22 | 12 57 58.58 | 1.7534 | 6 2 7.1 | 13.770 |
| 23 | 12 59 43.83 | 1.7550 | S. 6 15 52.7 | 13.750 |

#### WEDNESDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 1 29.18 | 1.7567 | S. 0 29 37.1 | 13.729 |
| 1 | 13 3 14.63 | 1.7584 | 6 43 20.2 | 13.707 |
| 2 | 13 5 0.18 | 1.7601 | 6 57 1.9 | 13.684 |
| 3 | 13 6 45.84 | 1.7619 | 7 10 42.2 | 13.660 |
| 4 | 13 8 31.61 | 1.7638 | 7 24 21.1 | 13.635 |
| 5 | 13 10 17.50 | 1.7658 | 7 37 58.5 | 13.610 |
| 6 | 13 12 3.51 | 1.7679 | 7 51 34.3 | 13.584 |
| 7 | 13 13 49.65 | 1.7702 | 8 5 8.6 | 13.557 |
| 8 | 13 15 35.93 | 1.7725 | 8 18 41.2 | 13.530 |
| 9 | 13 17 22.35 | 1.7747 | 8 32 12.2 | 13.502 |
| 10 | 13 19 8.90 | 1.7771 | 8 45 41.5 | 13.474 |
| 11 | 13 20 55.60 | 1.7796 | 8 59 9.1 | 13.445 |
| 12 | 13 22 42.45 | 1.7821 | 9 12 34.9 | 13.415 |
| 13 | 13 24 29.45 | 1.7847 | 9 25 58.9 | 13.384 |
| 14 | 13 26 16.61 | 1.7873 | 9 39 21.0 | 13.352 |
| 15 | 13 28 3.93 | 1.7900 | 9 52 41.2 | 13.320 |
| 16 | 13 29 51.42 | 1.7928 | 10 5 59.5 | 13.288 |
| 17 | 13 31 39.08 | 1.7957 | 10 19 15.8 | 13.254 |
| 18 | 13 33 26.91 | 1.7987 | 10 32 30.0 | 13.219 |
| 19 | 13 35 14.92 | 1.8018 | 10 45 42.1 | 13.184 |
| 20 | 13 37 3.12 | 1.8049 | 10 58 52.1 | 13.149 |
| 21 | 13 38 51.51 | 1.8081 | 11 12 0.0 | 13.114 |
| 22 | 13 40 40.09 | 1.8113 | 11 25 5.8 | 13.077 |
| 23 | 13 42 28.87 | 1.8147 | 11 38 9.3 | 13.038 |
| 24 | 13 44 17.85 | 1.8181 | S.11 51 10.4 | 12.998 |

#### THURSDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 44 17.85 | 1.8181 | S.11 51 10.4 | 12.998 |
| 1 | 13 46 7.04 | 1.8216 | 12 4 9.1 | 12.958 |
| 2 | 13 47 56.44 | 1.8252 | 12 17 5.4 | 12.917 |
| 3 | 13 49 46.06 | 1.8288 | 12 29 59.2 | 12.876 |
| 4 | 13 51 35.90 | 1.8325 | 12 42 50.5 | 12.834 |
| 5 | 13 53 25.96 | 1.8363 | 12 55 39.3 | 12.791 |
| 6 | 13 55 16.25 | 1.8401 | 13 8 25.5 | 12.747 |
| 7 | 13 57 6.77 | 1.8440 | 13 21 9.0 | 12.702 |
| 8 | 13 58 57.53 | 1.8479 | 13 33 49.8 | 12.657 |
| 9 | 14 0 48.53 | 1.8520 | 13 46 27.9 | 12.611 |
| 10 | 14 2 39.78 | 1.8562 | 13 59 3.2 | 12.564 |
| 11 | 14 4 31.28 | 1.8604 | 14 11 35.6 | 12.516 |
| 12 | 14 6 23.03 | 1.8647 | 14 24 5.1 | 12.467 |
| 13 | 14 8 15.04 | 1.8691 | 14 36 31.7 | 12.418 |
| 14 | 14 10 7.32 | 1.8736 | 14 48 55.4 | 12.368 |
| 15 | 14 11 59.87 | 1.8781 | 15 1 16.0 | 12.317 |
| 16 | 14 13 52.69 | 1.8826 | 15 13 33.5 | 12.265 |
| 17 | 14 15 45.78 | 1.8872 | 15 25 47.8 | 12.212 |
| 18 | 14 17 39.15 | 1.8918 | 15 37 58.9 | 12.158 |
| 19 | 14 19 32.80 | 1.8965 | 15 50 6.8 | 12.104 |
| 20 | 14 21 26.74 | 1.9014 | 16 2 11.4 | 12.048 |
| 21 | 14 23 20.98 | 1.9064 | 16 14 12.6 | 11.992 |
| 22 | 14 25 15.52 | 1.9114 | 16 26 10.4 | 11.934 |
| 23 | 14 27 10.36 | 1.9164 | S.16 38 4.7 | 11.875 |

#### FRIDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 29 5.49 | 1.9215 | S.16 49 55.4 | 11.815 |
| 1 | 14 31 0.93 | 1.9267 | 17 1 42.5 | 11.755 |
| 2 | 14 32 56.69 | 1.9320 | 17 13 26.0 | 11.694 |
| 3 | 14 34 52.77 | 1.9373 | 17 25 5.8 | 11.632 |
| 4 | 14 36 49.17 | 1.9427 | 17 36 41.8 | 11.568 |
| 5 | 14 38 45.89 | 1.9481 | 17 48 14.0 | 11.503 |
| 6 | 14 40 42.94 | 1.9536 | 17 59 42.3 | 11.438 |
| 7 | 14 42 40.32 | 1.9592 | 18 11 6.6 | 11.372 |
| 8 | 14 44 38.04 | 1.9648 | 18 22 26.9 | 11.305 |
| 9 | 14 46 36.09 | 1.9704 | 18 33 43.2 | 11.237 |
| 10 | 14 48 34.48 | 1.9761 | 18 44 55.4 | 11.168 |
| 11 | 14 50 33.22 | 1.9820 | 18 56 3.5 | 11.098 |
| 12 | 14 52 32.32 | 1.9879 | 19 7 7.3 | 11.027 |
| 13 | 14 54 31.77 | 1.9938 | 19 18 6.8 | 10.955 |
| 14 | 14 56 31.57 | 1.9997 | 19 29 1.9 | 10.881 |
| 15 | 14 58 31.73 | 2.0057 | 19 39 52.5 | 10.806 |
| 16 | 15 0 32.25 | 2.0118 | 19 50 38.6 | 10.730 |
| 17 | 15 2 33.14 | 2.0179 | 20 1 20.1 | 10.653 |
| 18 | 15 4 34.41 | 2.0240 | 20 11 57.0 | 10.576 |
| 19 | 15 6 36.04 | 2.0303 | 20 22 29.2 | 10.497 |
| 20 | 15 8 38.05 | 2.0366 | 20 32 56.7 | 10.417 |
| 21 | 15 10 40.44 | 2.0429 | 20 43 19.3 | 10.335 |
| 22 | 15 12 43.21 | 2.0493 | 20 53 36.9 | 10.252 |
| 23 | 15 14 46.36 | 2.0557 | 21 3 49.5 | 10.168 |
| 24 | 15 16 49.90 | 2.0622 | S.21 13 57.1 | 10.084 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### SATURDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 16 49.90 | 2.0622 | S.21 13 57.1 | 10.084 |
| 1 | 15 18 53.83 | 2.0687 | 21 23 59.6 | 9.998 |
| 2 | 15 20 58.15 | 2.0753 | 21 33 56.9 | 9.911 |
| 3 | 15 23 2.87 | 2.0820 | 21 43 48.9 | 9.822 |
| 4 | 15 25 7.99 | 2.0887 | 21 53 35.6 | 9.733 |
| 5 | 15 27 13.51 | 2.0953 | 22 3 17.0 | 9.643 |
| 6 | 15 29 19.43 | 2.1020 | 22 12 52.9 | 9.552 |
| 7 | 15 31 25.75 | 2.1087 | 22 22 23.3 | 9.459 |
| 8 | 15 33 32.48 | 2.1156 | 22 31 48.0 | 9.364 |
| 9 | 15 35 39.62 | 2.1224 | 22 41 7.0 | 9.269 |
| 10 | 15 37 47.17 | 2.1292 | 22 50 20.3 | 9.173 |
| 11 | 15 39 55.13 | 2.1360 | 22 59 27.8 | 9.075 |
| 12 | 15 42 3.49 | 2.1429 | 23 8 29.4 | 8.975 |
| 13 | 15 44 12.27 | 2.1498 | 23 17 24.9 | 8.874 |
| 14 | 15 46 21.47 | 2.1568 | 23 26 14.3 | 8.772 |
| 15 | 15 48 31.09 | 2.1638 | 23 34 57.6 | 8.670 |
| 16 | 15 50 41.13 | 2.1708 | 23 43 34.7 | 8.567 |
| 17 | 15 52 51.59 | 2.1778 | 23 52 5.6 | 8.462 |
| 18 | 15 55 2.47 | 2.1849 | 24 0 30.2 | 8.355 |
| 19 | 15 57 13.78 | 2.1920 | 24 8 48.3 | 8.247 |
| 20 | 15 59 25.51 | 2.1990 | 24 16 59.8 | 8.137 |
| 21 | 16 1 37.66 | 2.2060 | 24 25 4.7 | 8.026 |
| 22 | 16 3 50.23 | 2.2131 | 24 33 2.9 | 7.914 |
| 23 | 16 6 3.23 | 2.2202 | S.24 40 54.3 | 7.801 |

#### SUNDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 16 8 16.65 | 2.2272 | S.24 48 38.9 | 7.687 |
| 1 | 16 10 30.49 | 2.2342 | 24 56 16.7 | 7.571 |
| 2 | 16 12 44.75 | 2.2412 | 25 3 47.5 | 7.454 |
| 3 | 16 14 59.43 | 2.2482 | 25 11 11.2 | 7.335 |
| 4 | 16 17 14.53 | 2.2552 | 25 18 27.7 | 7.214 |
| 5 | 16 19 30.06 | 2.2623 | 25 25 36.9 | 7.092 |
| 6 | 16 21 46.01 | 2.2693 | 25 32 38.8 | 6.970 |
| 7 | 16 24 2.38 | 2.2763 | 25 39 33.3 | 6.847 |
| 8 | 16 26 19.17 | 2.2833 | 25 46 20.4 | 6.722 |
| 9 | 16 28 36.38 | 2.2903 | 25 52 59.9 | 6.595 |
| 10 | 16 30 54.01 | 2.2973 | 25 59 31.8 | 6.467 |
| 11 | 16 33 12.06 | 2.3043 | 26 5 55.9 | 6.337 |
| 12 | 16 35 30.53 | 2.3113 | 26 12 12.2 | 6.207 |
| 13 | 16 37 49.43 | 2.3182 | 26 18 20.7 | 6.076 |
| 14 | 16 40 8.73 | 2.3250 | 26 24 21.3 | 5.943 |
| 15 | 16 42 28.43 | 2.3317 | 26 30 13.9 | 5.808 |
| 16 | 16 44 48.54 | 2.3385 | 26 35 58.3 | 5.672 |
| 17 | 16 47 9.05 | 2.3452 | 26 41 34.5 | 5.535 |
| 18 | 16 49 29.96 | 2.3518 | 26 47 2.5 | 5.397 |
| 19 | 16 51 51.27 | 2.3584 | 26 52 22.1 | 5.257 |
| 20 | 16 54 12.98 | 2.3650 | 26 57 33.3 | 5.116 |
| 21 | 16 56 35.09 | 2.3715 | 27 2 36.0 | 4.973 |
| 22 | 16 58 57.59 | 2.3780 | 27 7 30.1 | 4.829 |
| 23 | 17 1 20.47 | 2.3844 | 27 12 15.5 | 4.684 |
| 24 | 17 3 43.73 | 2.3908 | S.27 16 52.2 | 4.538 |

#### MONDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 3 43.73 | 2.3908 | S.27 16 52.2 | 4.538 |
| 1 | 17 6 7.37 | 2.3971 | 27 21 20.1 | 4.391 |
| 2 | 17 8 31.38 | 2.4032 | 27 25 39.1 | 4.242 |
| 3 | 17 10 55.76 | 2.4092 | 27 29 49.1 | 4.092 |
| 4 | 17 13 20.50 | 2.4153 | 27 33 50.1 | 3.941 |
| 5 | 17 15 45.60 | 2.4213 | 27 37 42.0 | 3.788 |
| 6 | 17 18 11.06 | 2.4273 | 27 41 24.7 | 3.634 |
| 7 | 17 20 36.88 | 2.4332 | 27 44 58.1 | 3.479 |
| 8 | 17 23 3.05 | 2.4390 | 27 48 22.2 | 3.324 |
| 9 | 17 25 29.56 | 2.4446 | 27 51 37.0 | 3.167 |
| 10 | 17 27 56.40 | 2.4501 | 27 54 42.3 | 3.009 |
| 11 | 17 30 23.57 | 2.4555 | 27 57 38.1 | 2.851 |
| 12 | 17 32 51.06 | 2.4609 | 28 0 24.4 | 2.691 |
| 13 | 17 35 18.87 | 2.4662 | 28 3 1.0 | 2.529 |
| 14 | 17 37 47.00 | 2.4714 | 28 5 27.9 | 2.366 |
| 15 | 17 40 15.44 | 2.4765 | 28 7 45.0 | 2.201 |
| 16 | 17 42 44.18 | 2.4814 | 28 9 52.1 | 2.036 |
| 17 | 17 45 13.21 | 2.4862 | 28 11 49.3 | 1.871 |
| 18 | 17 47 42.52 | 2.4908 | 28 13 36.6 | 1.705 |
| 19 | 17 50 12.11 | 2.4955 | 28 15 13.9 | 1.538 |
| 20 | 17 52 41.98 | 2.5001 | 28 16 41.2 | 1.369 |
| 21 | 17 55 12.12 | 2.5046 | 28 17 58.3 | 1.199 |
| 22 | 17 57 42.53 | 2.5089 | 28 19 5.1 | 1.028 |
| 23 | 18 0 13.19 | 2.5130 | S.28 20 1.7 | 0.857 |

#### TUESDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 18 2 44.09 | 2.5170 | S.28 20 48.0 | 0.685 |
| 1 | 18 5 15.23 | 2.5209 | 28 21 23.9 | 0.512 |
| 2 | 18 7 46.60 | 2.5247 | 28 21 49.4 | 0.338 |
| 3 | 18 10 18.19 | 2.5283 | 28 22 4.4 | 0.163 |
| 4 | 18 12 49.99 | 2.5319 | 28 22 8.9 | 0.012 |
| 5 | 18 15 22.01 | 2.5353 | 28 22 2.9 | 0.187 |
| 6 | 18 17 54.23 | 2.5384 | 28 21 46.4 | 0.364 |
| 7 | 18 20 26.63 | 2.5415 | 28 21 19.2 | 0.543 |
| 8 | 18 22 59.21 | 2.5444 | 28 20 41.3 | 0.722 |
| 9 | 18 25 31.96 | 2.5472 | 28 19 52.6 | 0.901 |
| 10 | 18 28 4.88 | 2.5499 | 28 18 53.2 | 1.079 |
| 11 | 18 30 37.95 | 2.5523 | 28 17 43.1 | 1.258 |
| 12 | 18 33 11.16 | 2.5546 | 28 16 22.2 | 1.438 |
| 13 | 18 35 44.51 | 2.5569 | 28 14 50.5 | 1.619 |
| 14 | 18 38 17.99 | 2.5591 | 28 13 7.9 | 1.800 |
| 15 | 18 40 51.60 | 2.5610 | 28 11 14.5 | 1.981 |
| 16 | 18 43 25.32 | 2.5628 | 28 9 10.2 | 2.162 |
| 17 | 18 45 59.14 | 2.5645 | 28 6 55.0 | 2.344 |
| 18 | 18 48 33.06 | 2.5661 | 28 4 28.9 | 2.526 |
| 19 | 18 51 7.07 | 2.5674 | 28 1 51.9 | 2.709 |
| 20 | 18 53 41.15 | 2.5686 | 27 59 3.9 | 2.892 |
| 21 | 18 56 15.30 | 2.5697 | 27 56 4.9 | 3.075 |
| 22 | 18 58 49.51 | 2.5706 | 27 52 55.0 | 3.258 |
| 23 | 19 1 23.77 | 2.5714 | 27 49 34.1 | 3.441 |
| 24 | 19 3 58.08 | 2.5721 | S.27 46 2.1 | 3.626 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### WEDNESDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 19 3 58.08 | 2.5721 | S.27 46 2.1 | 3.625 |
| 1 | 19 6 32.42 | 2.5726 | 27 42 19.1 | 3.809 |
| 2 | 19 9 6.78 | 2.5730 | 27 38 25.1 | 3.993 |
| 3 | 19 11 41.17 | 2.5733 | 27 34 20.0 | 4.177 |
| 4 | 19 14 15.57 | 2.5732 | 27 30 3.8 | 4.361 |
| 5 | 19 16 49.96 | 2.5730 | 27 25 36.6 | 4.545 |
| 6 | 19 19 24.33 | 2.5728 | 27 20 58.4 | 4.729 |
| 7 | 19 21 58.68 | 2.5724 | 27 16 9.2 | 4.912 |
| 8 | 19 24 33.01 | 2.5719 | 27 11 9.0 | 5.095 |
| 9 | 19 27 7.31 | 2.5712 | 27 5 57.9 | 5.277 |
| 10 | 19 29 41.55 | 2.5702 | 27 0 35.8 | 5.459 |
| 11 | 19 32 15.73 | 2.5691 | 26 55 2.8 | 5.641 |
| 12 | 19 34 49.84 | 2.5679 | 26 49 18.9 | 5.822 |
| 13 | 19 37 23.88 | 2.5667 | 26 43 24.1 | 6.004 |
| 14 | 19 39 57.85 | 2.5655 | 26 37 18.4 | 6.185 |
| 15 | 19 42 31.74 | 2.5641 | 26 31 1.9 | 6.365 |
| 16 | 19 45 5.54 | 2.5625 | 26 24 34.6 | 6.545 |
| 17 | 19 47 39.24 | 2.5607 | 26 17 56.8 | 6.725 |
| 18 | 19 50 12.83 | 2.5589 | 26 11 7.8 | 6.904 |
| 19 | 19 52 46.31 | 2.5570 | 26 4 8.2 | 7.082 |
| 20 | 19 55 19.67 | 2.5549 | 25 56 58.0 | 7.259 |
| 21 | 19 57 52.90 | 2.5527 | 25 49 37.2 | 7.436 |
| 22 | 20 0 25.99 | 2.5503 | 25 42 5.8 | 7.612 |
| 23 | 20 2 58.93 | 2.5478 | S.25 34 23.8 | 7.787 |

### THURSDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 20 5 31.72 | 2.5452 | S.25 26 31.3 | 7.961 |
| 1 | 20 8 4.36 | 2.5425 | 25 18 28.4 | 8.135 |
| 2 | 20 10 36.83 | 2.5397 | 25 10 15.1 | 8.308 |
| 3 | 20 13 9.13 | 2.5367 | 25 1 51.4 | 8.481 |
| 4 | 20 15 41.25 | 2.5337 | 24 53 17.4 | 8.652 |
| 5 | 20 18 13.19 | 2.5307 | 24 44 33.2 | 8.821 |
| 6 | 20 20 44.94 | 2.5275 | 24 35 38.9 | 8.990 |
| 7 | 20 23 16.49 | 2.5242 | 24 26 34.5 | 9.158 |
| 8 | 20 25 47.84 | 2.5208 | 24 17 20.0 | 9.325 |
| 9 | 20 28 18.99 | 2.5174 | 24 7 55.5 | 9.491 |
| 10 | 20 30 49.93 | 2.5139 | 23 58 21.1 | 9.656 |
| 11 | 20 33 20.66 | 2.5103 | 23 48 36.9 | 9.820 |
| 12 | 20 35 51.17 | 2.5066 | 23 38 42.8 | 9.983 |
| 13 | 20 38 21.45 | 2.5027 | 23 28 39.0 | 10.144 |
| 14 | 20 40 51.50 | 2.4989 | 23 18 25.6 | 10.303 |
| 15 | 20 43 21.32 | 2.4950 | 23 8 2.6 | 10.462 |
| 16 | 20 45 50.90 | 2.4910 | 22 57 30.1 | 10.620 |
| 17 | 20 48 20.24 | 2.4870 | 22 46 48.2 | 10.776 |
| 18 | 20 50 49.34 | 2.4829 | 22 35 57.0 | 10.931 |
| 19 | 20 53 18.19 | 2.4787 | 22 24 56.5 | 11.084 |
| 20 | 20 55 46.78 | 2.4744 | 22 13 46.9 | 11.236 |
| 21 | 20 58 15.11 | 2.4701 | 22 2 28.2 | 11.386 |
| 22 | 21 0 43.19 | 2.4658 | 21 51 0.5 | 11.535 |
| 23 | 21 3 11.01 | 2.4615 | 21 39 23.9 | 11.684 |
| 24 | 21 5 38.57 | 2.4571 | S.21 27 38.4 | 11.831 |

### FRIDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 5 38.57 | 2.4571 | S.21 27 38.4 | 11.831 |
| 1 | 21 8 5.86 | 2.4526 | 21 15 44.2 | 11.976 |
| 2 | 21 10 32.88 | 2.4481 | 21 3 41.3 | 12.120 |
| 3 | 21 12 59.63 | 2.4437 | 20 51 29.8 | 12.262 |
| 4 | 21 15 26.12 | 2.4392 | 20 39 9.9 | 12.401 |
| 5 | 21 17 52.33 | 2.4345 | 20 26 41.7 | 12.538 |
| 6 | 21 20 18.26 | 2.4298 | 20 14 5.3 | 12.675 |
| 7 | 21 22 43.91 | 2.4252 | 20 1 20.7 | 12.810 |
| 8 | 21 25 9.29 | 2.4207 | 19 48 28.0 | 12.944 |
| 9 | 21 27 34.39 | 2.4160 | 19 35 27.3 | 13.077 |
| 10 | 21 29 59.21 | 2.4113 | 19 22 18.7 | 13.208 |
| 11 | 21 32 23.75 | 2.4065 | 19 9 2.3 | 13.337 |
| 12 | 21 34 48.00 | 2.4018 | 18 55 38.2 | 13.464 |
| 13 | 21 37 11.97 | 2.3972 | 18 42 6.6 | 13.588 |
| 14 | 21 39 35.66 | 2.3926 | 18 28 27.6 | 13.712 |
| 15 | 21 41 59.08 | 2.3879 | 18 14 41.2 | 13.834 |
| 16 | 21 44 22.21 | 2.3832 | 18 0 47.5 | 13.954 |
| 17 | 21 46 45 06 | 2.3785 | 17 46 46.7 | 14.072 |
| 18 | 21 49 7.63 | 2.3738 | 17 32 38.9 | 14.188 |
| 19 | 21 51 29.92 | 2.3692 | 17 18 24.0 | 14.303 |
| 20 | 21 53 51.93 | 2.3646 | 17 4 2.4 | 14.416 |
| 21 | 21 56 13.66 | 2.3599 | 16 49 34.1 | 14.527 |
| 22 | 21 58 35.11 | 2.3552 | 16 34 59.2 | 14.636 |
| 23 | 22 0 56.29 | 2.3507 | S.16 20 17.8 | 14.743 |

### SATURDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 22 3 17.20 | 2.3462 | S.16 5 30.0 | 14.849 |
| 1 | 22 5 37.84 | 2.3416 | 15 50 35.9 | 14.953 |
| 2 | 22 7 58.20 | 2.3370 | 15 35 35.7 | 15.055 |
| 3 | 22 10 18.28 | 2.3324 | 15 20 29.5 | 15.154 |
| 4 | 22 12 38.09 | 2.3280 | 15 5 17.3 | 15.252 |
| 5 | 22 14 57.64 | 2.3236 | 14 49 59.3 | 15.347 |
| 6 | 22 17 16.93 | 2.3192 | 14 34 35.7 | 15.441 |
| 7 | 22 19 35.95 | 2.3148 | 14 19 6.4 | 15.533 |
| 8 | 22 21 54.71 | 2.3106 | 14 3 31.7 | 15.623 |
| 9 | 22 24 13.22 | 2.3063 | 13 47 51.6 | 15.711 |
| 10 | 22 26 31.47 | 2.3021 | 13 32 6.3 | 15.797 |
| 11 | 22 28 49.47 | 2.2979 | 13 16 15.9 | 15.882 |
| 12 | 22 31 7.22 | 2.2937 | 13 0 20.4 | 15.964 |
| 13 | 22 33 24.72 | 2.2897 | 12 44 20.0 | 16.044 |
| 14 | 22 35 41.98 | 2.2857 | 12 28 14.9 | 16.123 |
| 15 | 22 37 59.00 | 2.2817 | 12 12 5.2 | 16.200 |
| 16 | 22 40 15.78 | 2.2777 | 11 55 50.9 | 16.276 |
| 17 | 22 42 32.32 | 2.2738 | 11 39 32.2 | 16.349 |
| 18 | 22 44 48.63 | 2.2700 | 11 23 9.0 | 16.420 |
| 19 | 22 47 4.72 | 2.2663 | 11 6 41.7 | 16.488 |
| 20 | 22 49 20.59 | 2.2627 | 10 50 10.4 | 16.554 |
| 21 | 22 51 36.24 | 2.2590 | 10 33 35.2 | 16.619 |
| 22 | 22 53 51.67 | 2.2553 | 10 16 56.1 | 16.682 |
| 23 | 22 56 6.88 | 2.2517 | 10 0 13.3 | 16.743 |
| 24 | 22 58 21.88 | 2.2484 | S. 9 43 26.8 | 16.803 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 17.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 58 21.88 | 2.2484 | S. 9 43 26.8 | 16.803 |
| 1 | 23 0 36.68 | 2.2451 | 9 26 36.8 | 16.861 |
| 2 | 23 2 51.28 | 2.2418 | 9 9 43.4 | 16.917 |
| 3 | 23 5 5.69 | 2.2385 | 8 52 46.7 | 16.970 |
| 4 | 23 7 19.90 | 2.2353 | 8 35 46.9 | 17.019 |
| 5 | 23 9 33.92 | 2.2322 | 8 18 44.3 | 17.067 |
| 6 | 23 11 47.76 | 2.2292 | 8 1 38.8 | 17.114 |
| 7 | 23 14 1.42 | 2.2262 | 7 44 30.5 | 17.160 |
| 8 | 23 16 14.90 | 2.2232 | 7 27 19.5 | 17.204 |
| 9 | 23 18 28.21 | 2.2204 | 7 10 6.0 | 17.245 |
| 10 | 23 20 41.35 | 2.2176 | 6 52 50.1 | 17.285 |
| 11 | 23 22 54.32 | 2.2149 | 6 35 31.8 | 17.323 |
| 12 | 23 25 7.14 | 2.2123 | 6 18 11.3 | 17.359 |
| 13 | 23 27 19.80 | 2.2098 | 6 0 48.7 | 17.392 |
| 14 | 23 29 32.31 | 2.2074 | 5 43 24.2 | 17.423 |
| 15 | 23 31 44.68 | 2.2050 | 5 25 57.9 | 17.453 |
| 16 | 23 33 56.91 | 2.2027 | 5 8 29.8 | 17.481 |
| 17 | 23 36 9.01 | 2.2006 | 4 51 0.1 | 17.507 |
| 18 | 23 38 20.98 | 2.1984 | 4 33 28.9 | 17.531 |
| 19 | 23 40 32.82 | 2.1963 | 4 15 56.3 | 17.553 |
| 20 | 23 42 44.54 | 2.1943 | 3 58 22.5 | 17.573 |
| 21 | 23 44 56.14 | 2.1924 | 3 40 47.5 | 17.592 |
| 22 | 23 47 7.63 | 2.1907 | 3 23 11.4 | 17.609 |
| 23 | 23 49 19.02 | 2.1890 | S. 3 5 34.4 | 17.623 |

### MONDAY 18.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 23 51 30.31 | 2.1873 | S. 2 47 56.6 | 17.635 |
| 1 | 23 53 41.50 | 2.1857 | 2 30 18.2 | 17.645 |
| 2 | 23 55 52.59 | 2.1842 | 2 12 39.2 | 17.654 |
| 3 | 23 58 3.60 | 2.1829 | 1 54 59.7 | 17.661 |
| 4 | 0 0 14.54 | 2.1816 | 1 37 19.8 | 17.666 |
| 5 | 0 2 25.40 | 2.1804 | 1 19 39.7 | 17.669 |
| 6 | 0 4 36.19 | 2.1793 | 1 1 59.5 | 17.671 |
| 7 | 0 6 46.91 | 2.1782 | 0 44 19.2 | 17.671 |
| 8 | 0 8 57.57 | 2.1772 | 0 26 39.0 | 17.669 |
| 9 | 0 11 8.18 | 2.1764 | S. 0 8 59.0 | 17.664 |
| 10 | 0 13 18.74 | 2.1756 | N. 0 8 40.7 | 17.657 |
| 11 | 0 15 29.25 | 2.1748 | 0 26 19.9 | 17.648 |
| 12 | 0 17 39.72 | 2.1741 | 0 43 58.5 | 17.638 |
| 13 | 0 19 50.15 | 2.1736 | 1 1 36.5 | 17.627 |
| 14 | 0 22 0.55 | 2.1732 | 1 19 13.8 | 17.614 |
| 15 | 0 24 10.93 | 2.1728 | 1 36 50.3 | 17.599 |
| 16 | 0 26 21.29 | 2.1725 | 1 54 25.8 | 17.582 |
| 17 | 0 28 31.63 | 2.1722 | 2 12 0.1 | 17.562 |
| 18 | 0 30 41.95 | 2.1720 | 2 29 33.2 | 17.541 |
| 19 | 0 32 52.27 | 2.1719 | 2 47 5.0 | 17.518 |
| 20 | 0 35 2.59 | 2.1720 | 3 4 35.4 | 17.494 |
| 21 | 0 37 12.92 | 2.1722 | 3 22 4.4 | 17.469 |
| 22 | 0 39 23.26 | 2.1724 | 3 39 31.9 | 17.443 |
| 23 | 0 41 33.61 | 2.1727 | 3 56 57.6 | 17.414 |
| 24 | 0 43 43.98 | 2.1732 | N. 4 14 21.4 | 17.382 |

### TUESDAY 19.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 43 43.98 | 2.1732 | N. 4 14 21.4 | 17.382 |
| 1 | 0 45 54.38 | 2.1737 | 4 31 43.2 | 17.347 |
| 2 | 0 48 4.82 | 2.1743 | 4 49 3.0 | 17.312 |
| 3 | 0 50 15.30 | 2.1749 | 5 6 20.7 | 17.276 |
| 4 | 0 52 25.82 | 2.1756 | 5 23 36.2 | 17.239 |
| 5 | 0 54 36.38 | 2.1763 | 5 40 49.4 | 17.200 |
| 6 | 0 56 46.98 | 2.1771 | 5 58 0.2 | 17.158 |
| 7 | 0 58 57.63 | 2.1780 | 6 15 8.4 | 17.114 |
| 8 | 1 1 8.34 | 2.1791 | 6 32 13.9 | 17.068 |
| 9 | 1 3 19.12 | 2.1803 | 6 49 16.7 | 17.021 |
| 10 | 1 5 29.98 | 2.1815 | 7 6 16.6 | 16.973 |
| 11 | 1 7 40.91 | 2.1828 | 7 23 13.5 | 16.924 |
| 12 | 1 9 51.92 | 2.1842 | 7 40 7.5 | 16.873 |
| 13 | 1 12 3.01 | 2.1856 | 7 56 58.3 | 16.819 |
| 14 | 1 14 14.19 | 2.1872 | 8 13 45.8 | 16.763 |
| 15 | 1 16 25.47 | 2.1888 | 8 30 29.9 | 16.706 |
| 16 | 1 18 36.85 | 2.1905 | 8 47 10.6 | 16.648 |
| 17 | 1 20 48.33 | 2.1922 | 9 3 47.8 | 16.589 |
| 18 | 1 22 59.91 | 2.1939 | 9 20 21.3 | 16.527 |
| 19 | 1 25 11.60 | 2.1957 | 9 36 51.0 | 16.463 |
| 20 | 1 27 23.40 | 2.1977 | 9 53 16.8 | 16.398 |
| 21 | 1 29 35.32 | 2.1997 | 10 9 38.7 | 16.332 |
| 22 | 1 31 47.37 | 2.2018 | 10 25 56.6 | 16.264 |
| 23 | 1 33 59.54 | 2.2039 | N.10 42 10.4 | 16.195 |

### WEDNESDAY 20.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 36 11.84 | 2.2062 | N.10 58 20.0 | 16.124 |
| 1 | 1 38 24.28 | 2.2085 | 11 14 25.3 | 16.051 |
| 2 | 1 40 36.86 | 2.2108 | 11 30 26.1 | 15.975 |
| 3 | 1 42 49.58 | 2.2132 | 11 46 22.3 | 15.898 |
| 4 | 1 45 2.44 | 2.2157 | 12 2 13.9 | 15.821 |
| 5 | 1 47 15.45 | 2.2182 | 12 18 0.8 | 15.742 |
| 6 | 1 49 28.62 | 2.2208 | 12 33 42.9 | 15.661 |
| 7 | 1 51 41.95 | 2.2235 | 12 49 20.1 | 15.579 |
| 8 | 1 53 55.44 | 2.2262 | 13 4 52.4 | 15.495 |
| 9 | 1 56 9.10 | 2.2290 | 13 20 19.6 | 15.410 |
| 10 | 1 58 22.93 | 2.2318 | 13 35 41.7 | 15.324 |
| 11 | 2 0 36.93 | 2.2347 | 13 50 58.5 | 15.235 |
| 12 | 2 2 51.10 | 2.2377 | 14 6 9.9 | 15.145 |
| 13 | 2 5 5.45 | 2.2407 | 14 21 15.9 | 15.054 |
| 14 | 2 7 19.98 | 2.2437 | 14 36 16.4 | 14.962 |
| 15 | 2 9 34.70 | 2.2469 | 14 51 11.3 | 14.868 |
| 16 | 2 11 49.61 | 2.2502 | 15 6 0.5 | 14.772 |
| 17 | 2 14 4.72 | 2.2535 | 15 20 43.9 | 14.675 |
| 18 | 2 16 20.03 | 2.2568 | 15 35 21.5 | 14.577 |
| 19 | 2 18 35.54 | 2.2602 | 15 49 53.2 | 14.477 |
| 20 | 2 20 51.25 | 2.2635 | 16 4 18.8 | 14.375 |
| 21 | 2 23 7.16 | 2.2669 | 16 18 38.2 | 14.272 |
| 22 | 2 25 23.28 | 2.2705 | 16 32 51.4 | 14.167 |
| 23 | 2 27 39.62 | 2.2742 | 16 46 58.3 | 14.062 |
| 24 | 2 29 56.18 | 2.2778 | N.17 0 58.9 | 13.956 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 29 56.18 | 2.2778 | N.17 0 58.9 | 13.956 |
| 1 | 2 32 12.96 | 2.2815 | 17 14 53.1 | 13.848 |
| 2 | 2 34 29.96 | 2.2852 | 17 28 40.7 | 13.738 |
| 3 | 2 36 47.18 | 2.2888 | 17 42 21.7 | 13.627 |
| 4 | 2 39 4.62 | 2.2925 | 17 55 56.0 | 13.515 |
| 5 | 2 41 22.28 | 2.2962 | 18 9 23.5 | 13.400 |
| 6 | 2 43 40.16 | 2.2998 | 18 22 44.1 | 13.285 |
| 7 | 2 45 58.26 | 2.3035 | 18 35 57.7 | 13.168 |
| 8 | 2 48 16.58 | 2.3072 | 18 49 4.3 | 13.050 |
| 9 | 2 50 35.12 | 2.3110 | 19 2 3.8 | 12.931 |
| 10 | 2 52 53.89 | 2.3148 | 19 14 56.1 | 12.811 |
| 11 | 2 55 12.89 | 2.3186 | 19 27 41.1 | 12.690 |
| 12 | 2 57 32.11 | 2.3223 | 19 40 18.8 | 12.567 |
| 13 | 2 59 51.56 | 2.3261 | 19 52 49.1 | 12.442 |
| 14 | 3 2 11.24 | 2.3299 | 20 5 11.8 | 12.315 |
| 15 | 3 4 31.15 | 2.3337 | 20 17 26.9 | 12.187 |
| 16 | 3 6 51.29 | 2.3376 | 20 29 34.3 | 12.059 |
| 17 | 3 9 11.66 | 2.3415 | 20 41 34.0 | 11.930 |
| 18 | 3 11 32.27 | 2.3454 | 20 53 25.9 | 11.799 |
| 19 | 3 13 53.11 | 2.3492 | 21 5 9.9 | 11.666 |
| 20 | 3 16 14.18 | 2.3531 | 21 16 45.9 | 11.532 |
| 21 | 3 18 35.48 | 2.3570 | 21 28 13.8 | 11.397 |
| 22 | 3 20 57.02 | 2.3609 | 21 39 33.6 | 11.262 |
| 23 | 3 23 18.79 | 2.3647 | N.21 50 45.3 | 11.126 |

### FRIDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 3 25 40.79 | 2.3685 | N.22 1 48.8 | 10.989 |
| 1 | 3 28 3.02 | 2.3723 | 22 12 44.0 | 10.850 |
| 2 | 3 30 25.47 | 2.3761 | 22 23 30.8 | 10.710 |
| 3 | 3 32 48.15 | 2.3799 | 22 34 9.2 | 10.569 |
| 4 | 3 35 11.06 | 2.3837 | 22 44 39.1 | 10.427 |
| 5 | 3 37 34.19 | 2.3874 | 22 55 0.4 | 10.284 |
| 6 | 3 39 57.55 | 2.3910 | 23 5 13.1 | 10.139 |
| 7 | 3 42 21.13 | 2.3946 | 23 15 17.1 | 9.994 |
| 8 | 3 44 44.92 | 2.3982 | 23 25 12.4 | 9.848 |
| 9 | 3 47 8.93 | 2.4018 | 23 34 58.9 | 9.701 |
| 10 | 3 49 33.16 | 2.4054 | 23 44 36.5 | 9.552 |
| 11 | 3 51 57.60 | 2.4090 | 23 54 5.1 | 9.402 |
| 12 | 3 54 22.25 | 2.4125 | 24 3 24.7 | 9.252 |
| 13 | 3 56 47.11 | 2.4160 | 24 12 35.3 | 9.101 |
| 14 | 3 59 12.17 | 2.4194 | 24 21 36.8 | 8.949 |
| 15 | 4 1 37.43 | 2.4227 | 24 30 29.2 | 8.797 |
| 16 | 4 4 2.89 | 2.4260 | 24 39 12.4 | 8.643 |
| 17 | 4 6 28.55 | 2.4293 | 24 47 46.3 | 8.488 |
| 18 | 4 8 54.41 | 2.4325 | 24 56 10.9 | 8.332 |
| 19 | 4 11 20.46 | 2.4357 | 25 4 26.1 | 8.174 |
| 20 | 4 13 46.69 | 2.4387 | 25 12 31.8 | 8.016 |
| 21 | 4 16 13.10 | 2.4416 | 25 20 28.0 | 7.856 |
| 22 | 4 18 39.68 | 2.4445 | 25 28 14.7 | 7.699 |
| 23 | 4 21 6.44 | 2.4473 | 25 35 51.9 | 7.540 |
| 24 | 4 23 33.36 | 2.4501 | N.25 43 19.5 | 7.380 |

### SATURDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 4 23 33.36 | 2.4501 | N.25 43 19.5 | 7.380 |
| 1 | 4 26 0.45 | 2.4528 | 25 50 37.5 | 7.219 |
| 2 | 4 28 27.70 | 2.4554 | 25 57 45.8 | 7.057 |
| 3 | 4 30 55.10 | 2.4579 | 26 4 44.4 | 6.895 |
| 4 | 4 33 22.65 | 2.4604 | 26 11 33.2 | 6.732 |
| 5 | 4 35 50.35 | 2.4628 | 26 18 12.2 | 6.568 |
| 6 | 4 38 18.19 | 2.4651 | 26 24 41.3 | 6.404 |
| 7 | 4 40 46.17 | 2.4673 | 26 31 0.6 | 6.240 |
| 8 | 4 43 14.28 | 2.4695 | 26 37 10.0 | 6.075 |
| 9 | 4 45 42.51 | 2.4715 | 26 43 9.6 | 5.910 |
| 10 | 4 48 10.86 | 2.4734 | 26 48 59.2 | 5.744 |
| 11 | 4 50 39.32 | 2.4752 | 26 54 38.8 | 5.577 |
| 12 | 4 53 7.88 | 2.4769 | 27 0 8.4 | 5.409 |
| 13 | 4 55 36.55 | 2.4786 | 27 5 27.9 | 5.241 |
| 14 | 4 58 5.31 | 2.4801 | 27 10 37.3 | 5.073 |
| 15 | 5 0 34.16 | 2.4815 | 27 15 36.6 | 4.905 |
| 16 | 5 3 3.09 | 2.4829 | 27 20 25.8 | 4.736 |
| 17 | 5 5 32.10 | 2.4842 | 27 25 4.9 | 4.567 |
| 18 | 5 8 1.19 | 2.4853 | 27 29 33.8 | 4.397 |
| 19 | 5 10 30.35 | 2.4863 | 27 33 52.5 | 4.227 |
| 20 | 5 12 59.56 | 2.4872 | 27 38 1.0 | 4.057 |
| 21 | 5 15 28.81 | 2.4879 | 27 41 59.3 | 3.887 |
| 22 | 5 17 58.11 | 2.4886 | 27 45 47.3 | 3.716 |
| 23 | 5 20 27.44 | 2.4890 | N.27 49 25.1 | 3.545 |

### SUNDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 5 22 56.79 | 2.4894 | N.27 52 52.7 | 3.374 |
| 1 | 5 25 26.16 | 2.4897 | 27 56 10.1 | 3.203 |
| 2 | 5 27 55.55 | 2.4900 | 27 59 17.2 | 3.032 |
| 3 | 5 30 24.96 | 2.4902 | 28 2 14.0 | 2.861 |
| 4 | 5 32 54.38 | 2.4901 | 28 5 0.5 | 2.690 |
| 5 | 5 35 23.78 | 2.4899 | 28 7 36.7 | 2.519 |
| 6 | 5 37 53.17 | 2.4897 | 28 10 2.7 | 2.348 |
| 7 | 5 40 22.54 | 2.4893 | 28 12 18.5 | 2.177 |
| 8 | 5 42 51.89 | 2.4889 | 28 14 24.0 | 2.006 |
| 9 | 5 45 21.21 | 2.4882 | 28 16 19.2 | 1.835 |
| 10 | 5 47 50.48 | 2.4874 | 28 18 4.2 | 1.664 |
| 11 | 5 50 19.70 | 2.4866 | 28 19 39.0 | 1.493 |
| 12 | 5 52 48.86 | 2.4855 | 28 21 3.5 | 1.323 |
| 13 | 5 55 17.96 | 2.4843 | 28 22 17.8 | 1.153 |
| 14 | 5 57 46.98 | 2.4830 | 28 23 21.9 | 0.983 |
| 15 | 6 0 15.92 | 2.4816 | 28 24 15.9 | 0.814 |
| 16 | 6 2 44.77 | 2.4801 | 28 24 59.7 | 0.645 |
| 17 | 6 5 13.53 | 2.4785 | 28 25 33.3 | 0.476 |
| 18 | 6 7 42.19 | 2.4768 | 28 25 56.8 | 0.307 |
| 19 | 6 10 10.75 | 2.4750 | 28 26 10.2 | 0.139 |
| 20 | 6 12 39.19 | 2.4730 | 28 26 13.5 | 0.029 |
| 21 | 6 15 7.51 | 2.4709 | 28 26 6.7 | 0.196 |
| 22 | 6 17 35.70 | 2.4686 | 28 25 49.9 | 0.362 |
| 23 | 6 20 3.75 | 2.4662 | 28 25 23.1 | 0.530 |
| 24 | 6 22 31.65 | 2.4638 | N.28 24 46.3 | 0.697 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | **MONDAY 25.** | | | | | **WEDNESDAY 27.** | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 6 22 31.65 | 2.4638 | N.28 24 46.3 | 0.697 | 0 | 8 16 4.05 | 2.2381 | N.24 54 16.7 | 7.703 |
| 1 | 6 24 59.41 | 2.4613 | 28 23 59.5 | 0.863 | 1 | 8 18 18.15 | 2.2319 | 24 46 30.9 | 7.823 |
| 2 | 6 27 27.01 | 2.4586 | 28 23 2.8 | 1.028 | 2 | 8 20 31.87 | 2.2257 | 24 38 37.9 | 7.943 |
| 3 | 6 29 54.44 | 2.4557 | 28 21 56.2 | 1.192 | 3 | 8 22 45.23 | 2.2196 | 24 30 37.8 | 8.060 |
| 4 | 6 32 21.70 | 2.4528 | 28 20 39.8 | 1.355 | 4 | 8 24 58.22 | 2.2134 | 24 22 30.7 | 8.176 |
| 5 | 6 34 48.78 | 2.4497 | 28 19 13.6 | 1.518 | 5 | 8 27 10.84 | 2.2072 | 24 14 16.7 | 8.291 |
| 6 | 6 37 15.67 | 2.4465 | 28 17 37.6 | 1.681 | 6 | 8 29 23.09 | 2.2011 | 24 5 55.8 | 8.405 |
| 7 | 6 39 42.36 | 2.4432 | 28 15 51.9 | 1.843 | 7 | 8 31 34.97 | 2.1949 | 23 57 28.1 | 8.518 |
| 8 | 6 42 8.85 | 2.4398 | 28 13 56.5 | 2.004 | 8 | 8 33 46.48 | 2.1887 | 23 48 53.7 | 8.629 |
| 9 | 6 44 35.14 | 2.4364 | 28 11 51.4 | 2.165 | 9 | 8 35 57.61 | 2.1824 | 23 40 12.6 | 8.740 |
| 10 | 6 47 1.22 | 2.4328 | 28 9 36.7 | 2.325 | 10 | 8 38 8.37 | 2.1762 | 23 31 24.9 | 8.849 |
| 11 | 6 49 27.08 | 2.4292 | 28 7 12.4 | 2.484 | 11 | 8 40 18.76 | 2.1700 | 23 22 30.7 | 8.957 |
| 12 | 6 51 52.72 | 2.4254 | 28 4 38.6 | 2.643 | 12 | 8 42 28.78 | 2.1638 | 23 13 30.1 | 9.063 |
| 13 | 6 54 18.13 | 2.4215 | 28 1 55.3 | 2.801 | 13 | 8 44 38.42 | 2.1576 | 23 4 23.2 | 9.168 |
| 14 | 6 56 43.30 | 2.4175 | 27 59 2.5 | 2.958 | 14 | 8 46 47.69 | 2.1514 | 22 55 10.1 | 9.271 |
| 15 | 6 59 8.23 | 2.4135 | 27 56 0.2 | 3.115 | 15 | 8 48 56.59 | 2.1452 | 22 45 50.7 | 9.374 |
| 16 | 7 1 32.92 | 2.4094 | 27 52 48.6 | 3.270 | 16 | 8 51 5.11 | 2.1390 | 22 36 25.2 | 9.475 |
| 17 | 7 3 57.36 | 2.4052 | 27 49 27.8 | 3.424 | 17 | 8 53 13.26 | 2.1328 | 22 26 53.7 | 9.575 |
| 18 | 7 6 21.54 | 2.4008 | 27 45 57.8 | 3.577 | 18 | 8 55 21.05 | 2.1267 | 22 17 16.2 | 9.674 |
| 19 | 7 8 45.45 | 2.3962 | 27 42 18.6 | 3.730 | 19 | 8 57 28.47 | 2.1206 | 22 7 32.8 | 9.772 |
| 20 | 7 11 9.09 | 2.3917 | 27 38 30.2 | 3.882 | 20 | 8 59 35.52 | 2.1144 | 21 57 43.5 | 9.869 |
| 21 | 7 13 32.46 | 2.3872 | 27 34 32.7 | 4.033 | 21 | 9 1 42.20 | 2.1082 | 21 47 48.4 | 9.965 |
| 22 | 7 15 55.56 | 2.3825 | 27 30 26.2 | 4.183 | 22 | 9 3 48.51 | 2.1021 | 21 37 47.7 | 10.059 |
| 23 | 7 18 18.37 | 2.3777 | N.27 26 10.8 | 4.332 | 23 | 9 5 54.45 | 2.0960 | N.21 27 41.4 | 10.152 |
| | **TUESDAY 26.** | | | | | **THURSDAY 28.** | | | |
| 0 | 7 20 40.89 | 2.3729 | N.27 21 46.5 | 4.479 | 0 | 9 8 0.03 | 2.0899 | N.21 17 29.5 | 10.243 |
| 1 | 7 23 3.12 | 2.3680 | 27 17 13.4 | 4.626 | 1 | 9 10 5.24 | 2.0838 | 21 7 12.2 | 10.332 |
| 2 | 7 25 25.05 | 2.3630 | 27 12 31.5 | 4.772 | 2 | 9 12 10.09 | 2.0778 | 20 56 49.5 | 10.422 |
| 3 | 7 27 46.67 | 2.3579 | 27 7 40.8 | 4.917 | 3 | 9 14 14.58 | 2.0718 | 20 46 21.4 | 10.510 |
| 4 | 7 30 7.98 | 2.3526 | 27 2 41.5 | 5.060 | 4 | 9 16 18.71 | 2.0659 | 20 35 48.1 | 10.597 |
| 5 | 7 32 28.98 | 2.3472 | 26 57 33.6 | 5.203 | 5 | 9 18 22.49 | 2.0600 | 20 25 9.7 | 10.683 |
| 6 | 7 34 49.66 | 2.3419 | 26 52 17.1 | 5.345 | 6 | 9 20 25.91 | 2.0540 | 20 14 26.2 | 10.768 |
| 7 | 7 37 10.02 | 2.3365 | 26 46 52.2 | 5.485 | 7 | 9 22 28.97 | 2.0481 | 20 3 37.6 | 10.852 |
| 8 | 7 39 30.05 | 2.3310 | 26 41 18.9 | 5.625 | 8 | 9 24 31.68 | 2.0422 | 19 52 44.0 | 10.934 |
| 9 | 7 41 49.75 | 2.3255 | 26 35 37.2 | 5.764 | 9 | 9 26 34.04 | 2.0364 | 19 41 45.5 | 11.015 |
| 10 | 7 44 9.11 | 2.3199 | 26 29 47.2 | 5.901 | 10 | 9 28 36.05 | 2.0307 | 19 30 42.2 | 11.094 |
| 11 | 7 46 28.14 | 2.3143 | 26 23 49.0 | 6.037 | 11 | 9 30 37.72 | 2.0250 | 19 19 34.2 | 11.172 |
| 12 | 7 48 46.83 | 2.3087 | 26 17 42.7 | 6.172 | 12 | 9 32 39.05 | 2.0193 | 19 8 21.6 | 11.249 |
| 13 | 7 51 5.18 | 2.3030 | 26 11 28.3 | 6.307 | 13 | 9 34 40.03 | 2.0137 | 18 57 4.4 | 11.325 |
| 14 | 7 53 23.19 | 2.2974 | 26 5 5.9 | 6.440 | 14 | 9 36 40.68 | 2.0081 | 18 45 42.6 | 11.401 |
| 15 | 7 55 40.87 | 2.2918 | 25 58 35.5 | 6.572 | 15 | 9 38 41.00 | 2.0025 | 18 34 16.3 | 11.475 |
| 16 | 7 57 58.21 | 2.2860 | 25 51 57.3 | 6.703 | 16 | 9 40 40.98 | 1.9968 | 18 22 45.6 | 11.548 |
| 17 | 8 0 15.19 | 2.2800 | 25 45 11.3 | 6.832 | 17 | 9 42 40.62 | 1.9912 | 18 11 10.5 | 11.620 |
| 18 | 8 2 31.81 | 2.2740 | 25 38 17.5 | 6.960 | 18 | 9 44 39.93 | 1.9857 | 17 59 31.2 | 11.690 |
| 19 | 8 4 48.07 | 2.2681 | 25 31 16.0 | 7.087 | 19 | 9 46 38.91 | 1.9803 | 17 47 47.7 | 11.759 |
| 20 | 8 7 3.98 | 2.2622 | 25 24 7.0 | 7.213 | 20 | 9 48 37.57 | 1.9750 | 17 36 0.1 | 11.827 |
| 21 | 8 9 19.54 | 2.2563 | 25 16 50.5 | 7.337 | 21 | 9 50 35.91 | 1.9697 | 17 24 8.4 | 11.895 |
| 22 | 8 11 34.74 | 2.2503 | 25 9 26.6 | 7.460 | 22 | 9 52 33.93 | 1.9644 | 17 12 12.7 | 11.961 |
| 23 | 8 13 49.58 | 2.2442 | 25 1 55.3 | 7.582 | 23 | 9 54 31.64 | 1.9591 | 17 0 13.1 | 12.026 |
| 24 | 8 16 4.05 | 2.2381 | N.24 54 16.7 | 7.703 | 24 | 9 56 29.03 | 1.9539 | N.16 48 9.6 | 12.090 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 56 29.03 | 1.9539 | N.16 48 9.6 | 12.090 |
| 1 | 9 58 26.12 | 1.9487 | 16 36 2.3 | 12.152 |
| 2 | 10 0 22.90 | 1.9437 | 16 23 51.3 | 12.214 |
| 3 | 10 2 19.37 | 1.9386 | 16 11 36.6 | 12.275 |
| 4 | 10 4 15.53 | 1.9336 | 15 59 18.3 | 12.334 |
| 5 | 10 6 11.40 | 1.9287 | 15 46 56.5 | 12.391 |
| 6 | 10 8 6.98 | 1.9239 | 15 34 31.3 | 12.448 |
| 7 | 10 10 2.27 | 1.9191 | 15 22 2.7 | 12.504 |
| 8 | 10 11 57.27 | 1.9143 | 15 9 30.8 | 12.560 |
| 9 | 10 13 51.99 | 1.9097 | 14 56 55.5 | 12.614 |
| 10 | 10 15 46.43 | 1.9050 | 14 44 17.0 | 12.667 |
| 11 | 10 17 40.59 | 1.9004 | 14 31 35.4 | 12.719 |
| 12 | 10 19 34.48 | 1.8959 | 14 18 50.7 | 12.771 |
| 13 | 10 21 28.10 | 1.8914 | 14 6 2.9 | 12.821 |
| 14 | 10 23 21.45 | 1.8870 | 13 53 12.2 | 12.869 |
| 15 | 10 25 14.54 | 1.8827 | 13 40 18.6 | 12.916 |
| 16 | 10 27 7.37 | 1.8784 | 13 27 22.1 | 12.963 |
| 17 | 10 28 59.94 | 1.8741 | 13 14 22.8 | 13.010 |
| 18 | 10 30 52.26 | 1.8699 | 13 1 20.8 | 13.055 |
| 19 | 10 32 44.33 | 1.8657 | 12 48 16.1 | 13.098 |
| 20 | 10 34 36.15 | 1.8616 | 12 35 8.9 | 13.141 |
| 21 | 10 36 27.72 | 1.8576 | 12 21 59.1 | 13.183 |
| 22 | 10 38 19.05 | 1.8537 | 12 8 46.8 | 13.224 |
| 23 | 10 40 10.16 | 1.8499 | N.11 55 32.1 | 13.265 |

### SATURDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 10 42 1.04 | 1.8461 | N.11 42 15.0 | 13.305 |
| 1 | 10 43 51.69 | 1.8422 | 11 28 55.5 | 13.343 |
| 2 | 10 45 42.11 | 1.8384 | 11 15 33.8 | 13.380 |
| 3 | 10 47 32.30 | 1.8347 | 11 2 9.9 | 13.416 |
| 4 | 10 49 22.27 | 1.8312 | 10 48 43.9 | 13.451 |
| 5 | 10 51 12.04 | 1.8278 | 10 35 15.8 | 13.485 |
| 6 | 10 53 1.62 | 1.8244 | 10 21 45.7 | 13.519 |
| 7 | 10 54 51.00 | 1.8211 | 10 8 13.6 | 13.552 |
| 8 | 10 56 40.17 | 1.8178 | 9 54 39.5 | 13.584 |
| 9 | 10 58 29.14 | 1.8145 | 9 41 3.5 | 13.614 |
| 10 | 11 0 17.91 | 1.8112 | 9 27 25.7 | 13.644 |
| 11 | 11 2 6.48 | 1.8081 | 9 13 46.2 | 13.673 |
| 12 | 11 3 54.85 | 1.8050 | 9 0 5.0 | 13.701 |
| 13 | 11 5 43.05 | 1.8020 | 8 46 22.1 | 13.728 |
| 14 | 11 7 31.08 | 1.7991 | 8 32 37.6 | 13.754 |
| 15 | 11 9 18.94 | 1.7963 | 8 18 51.6 | 13.779 |
| 16 | 11 11 6.64 | 1.7935 | 8 5 4.1 | 13.804 |
| 17 | 11 12 54.17 | 1.7907 | 7 51 15.1 | 13.828 |
| 18 | 11 14 41.53 | 1.7880 | 7 37 24.7 | 13.851 |
| 19 | 11 16 28.73 | 1.7855 | 7 23 33.0 | 13.873 |
| 20 | 11 18 15.78 | 1.7830 | 7 9 40.0 | 13.894 |
| 21 | 11 20 2.69 | 1.7806 | 6 55 45.7 | 13.915 |
| 22 | 11 21 49.45 | 1.7782 | 6 41 50.2 | 13.934 |
| 23 | 11 23 36.07 | 1.7759 | 6 27 53.6 | 13.952 |
| 24 | 11 25 22.55 | 1.7736 | N. 6 13 55.9 | 13.970 |

### SUNDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 11 25 22.55 | 1.7736 | N. 6 13 55.9 | 13.970 |
| 1 | 11 27 8.90 | 1.7714 | 5 59 57.2 | 13.987 |
| 2 | 11 28 55.12 | 1.7692 | 5 45 57.5 | 14.003 |
| 3 | 11 30 41.21 | 1.7671 | 5 31 56.8 | 14.019 |
| 4 | 11 32 27.18 | 1.7650 | 5 17 55.2 | 14.033 |
| 5 | 11 34 13.03 | 1.7631 | 5 3 52.8 | 14.047 |
| 6 | 11 35 58.76 | 1.7612 | 4 49 49.6 | 14.060 |
| 7 | 11 37 44.38 | 1.7595 | 4 35 45.6 | 14.072 |
| 8 | 11 39 29.90 | 1.7578 | 4 21 40.9 | 14.083 |
| 9 | 11 41 15.32 | 1.7562 | 4 7 35.6 | 14.094 |
| 10 | 11 43 0.64 | 1.7546 | 3 53 29.6 | 14.104 |
| 11 | 11 44 45.87 | 1.7531 | 3 39 23.1 | 14.113 |
| 12 | 11 46 31.01 | 1.7516 | 3 25 16.1 | 14.121 |
| 13 | 11 48 16.06 | 1.7502 | 3 11 8.6 | 14.128 |
| 14 | 11 50 1.03 | 1.7489 | 2 57 0.7 | 14.135 |
| 15 | 11 51 45.93 | 1.7477 | 2 42 52.4 | 14.141 |
| 16 | 11 53 30.76 | 1.7465 | 2 28 43.8 | 14.146 |
| 17 | 11 55 15.52 | 1.7454 | 2 14 34.9 | 14.150 |
| 18 | 11 57 0.21 | 1.7444 | 2 0 25.8 | 14.153 |
| 19 | 11 58 44.84 | 1.7435 | 1 46 16.5 | 14.156 |
| 20 | 12 0 29.42 | 1.7426 | 1 32 7.1 | 14.158 |
| 21 | 12 2 13.95 | 1.7418 | 1 17 57.6 | 14.160 |
| 22 | 12 3 58.43 | 1.7410 | 1 3 48.0 | 14.161 |
| 23 | 12 5 42.87 | 1.7403 | N. 0 49 38.3 | 14.162 |

### MONDAY, SEPT. 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 12 7 27.27 | 1.7396 | N. 0 35 28.6 | 14.162 |

## PHASES OF THE MOON.

| | Day. | h. m. |
|---|---|---|
| ☽ First Quarter, . | 8 | 12 22.2 |
| ○ Full Moon, . . | 15 | 17 55.3 |
| ☾ Last Quarter, . . | 22 | 9 7.8 |
| ● New Moon, . . | 29 | 23 14.2 |

| | Day. | h. |
|---|---|---|
| ☾ Apogee, . . . . | 5 | 12.6 |
| ☾ Perigee, . . . . | 17 | 14.2 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 2 | Sun | W. | 18 57 25 | 3412 | 20 19 28 | 3406 | 21 41 38 | 3401 | 23 3 53 | 3399 |
| | Spica | E. | 53 14 45 | 2927 | 51 43 1 | 2935 | 50 11 27 | 2944 | 48 40 4 | 2952 |
| | Mars | E. | 62 32 22 | 3130 | 61 4 49 | 3139 | 59 37 27 | 3148 | 58 10 15 | 3157 |
| | Antares | E. | 99 8 8 | 2927 | 97 36 21 | 2933 | 96 4 44 | 2942 | 94 33 18 | 2949 |
| 3 | Sun | W. | 29 55 21 | 3404 | 31 17 33 | 3408 | 32 39 41 | 3411 | 34 1 45 | 3415 |
| | Spica | E. | 41 5 40 | 2991 | 39 35 16 | 2998 | 38 5 1 | 3006 | 36 34 55 | 3013 |
| | Mars | E. | 50 56 49 | 3197 | 49 30 36 | 3204 | 48 4 32 | 3212 | 46 38 37 | 3219 |
| | Antares | E. | 86 58 32 | 2987 | 85 28 3 | 2994 | 83 57 43 | 3001 | 82 27 32 | 3008 |
| 4 | Sun | W. | 40 51 0 | 3434 | 42 12 38 | 3438 | 43 34 12 | 3441 | 44 55 42 | 3446 |
| | Spica | E. | 29 6 29 | 3044 | 27 37 11 | 3050 | 26 7 59 | 3056 | 24 38 55 | 3061 |
| | Mars | E. | 39 30 59 | 3250 | 38 5 49 | 3256 | 36 40 45 | 3261 | 35 15 48 | 3266 |
| | Antares | E. | 74 58 28 | 3036 | 73 29 0 | 3041 | 71 59 38 | 3047 | 70 30 22 | 3051 |
| | α Aquilæ | E. | 120 13 1 | 4217 | 119 4 51 | 4189 | 117 56 15 | 4162 | 116 47 13 | 4137 |
| 5 | Sun | W. | 51 42 21 | 3456 | 53 3 32 | 3459 | 54 24 42 | 3460 | 55 45 50 | 3461 |
| | Mars | E. | 28 12 15 | 3184 | 26 47 45 | 3187 | 25 23 18 | 3189 | 23 58 54 | 3190 |
| | Antares | E. | 63 5 15 | 3067 | 61 36 25 | 3069 | 60 7 38 | 3071 | 58 38 53 | 3073 |
| | α Aquilæ | E. | 110 56 37 | 4066 | 109 45 35 | 4033 | 108 34 18 | 4009 | 107 22 47 | 3995 |
| 6 | Sun | W. | 62 31 29 | 3461 | 63 52 37 | 3458 | 65 13 48 | 3456 | 66 35 1 | 3454 |
| | Antares | E. | 51 15 27 | 3074 | 49 46 46 | 3073 | 48 18 3 | 3072 | 46 49 19 | 3072 |
| | α Aquilæ | E. | 101 22 4 | 3939 | 100 9 24 | 3930 | 98 56 35 | 3922 | 97 43 38 | 3915 |
| 7 | Sun | W. | 73 21 56 | 3436 | 74 43 32 | 3430 | 76 5 15 | 3424 | 77 27 4 | 3418 |
| | Antares | E. | 39 24 56 | 3055 | 37 55 51 | 3050 | 36 26 40 | 3045 | 34 57 23 | 3039 |
| | α Aquilæ | E. | 91 37 4 | 3884 | 90 23 28 | 3879 | 89 9 47 | 3874 | 87 56 1 | 3870 |
| | Fomalhaut | E. | 120 28 25 | 3330 | 119 4 48 | 3317 | 117 40 56 | 3305 | 116 16 50 | 3293 |
| 8 | Sun | W. | 84 18 4 | 3381 | 85 40 42 | 3371 | 87 3 32 | 3361 | 88 26 33 | 3351 |
| | Spica | W. | 18 29 56 | 3021 | 19 59 43 | 3011 | 21 29 42 | 3001 | 22 59 54 | 2989 |
| | Antares | E. | 27 29 6 | 3006 | 25 59 1 | 2998 | 24 28 45 | 2989 | 22 58 19 | 2980 |
| | α Aquilæ | E. | 81 46 21 | 3856 | 80 32 19 | 3856 | 79 18 17 | 3857 | 78 4 14 | 3858 |
| | Fomalhaut | E. | 109 12 50 | 3233 | 107 47 20 | 3220 | 106 21 35 | 3209 | 104 55 36 | 3196 |
| 9 | Sun | W. | 95 24 38 | 3295 | 96 48 55 | 3282 | 98 13 28 | 3269 | 99 38 16 | 3255 |
| | Spica | W. | 30 34 24 | 2933 | 32 6 1 | 2920 | 33 37 54 | 2908 | 35 10 3 | 2896 |
| | Mars | W. | 17 11 28 | 3142 | 18 38 47 | 3129 | 20 6 21 | 3116 | 21 34 11 | 3103 |
| | α Aquilæ | E. | 71 54 26 | 3873 | 70 40 39 | 3880 | 69 26 59 | 3888 | 68 13 27 | 3897 |
| | Fomalhaut | E. | 97 41 59 | 3133 | 96 14 30 | 3121 | 94 46 46 | 3108 | 93 18 46 | 3094 |
| | α Pegasi | E. | 118 20 7 | 3336 | 116 56 37 | 3314 | 115 32 42 | 3292 | 114 8 21 | 3270 |
| 10 | Sun | W. | 106 46 26 | 3183 | 108 12 56 | 3166 | 109 39 46 | 3149 | 111 6 56 | 3133 |
| | Spica | W. | 42 55 5 | 2825 | 44 29 1 | 2810 | 46 3 16 | 2795 | 47 37 51 | 2779 |
| | Mars | W. | 28 57 30 | 3032 | 30 27 3 | 3017 | 31 56 55 | 3001 | 33 27 7 | 2985 |
| | α Aquilæ | E. | 62 8 44 | 3970 | 60 56 35 | 3989 | 59 44 45 | 4013 | 58 33 18 | 4040 |
| | Fomalhaut | E. | 85 54 37 | 3026 | 84 24 57 | 3014 | 82 55 1 | 3000 | 81 24 48 | 2987 |
| | α Pegasi | E. | 107 0 17 | 3166 | 105 33 27 | 3147 | 104 6 12 | 3127 | 102 38 35 | 3106 |
| | Jupiter | E. | 123 56 29 | 2808 | 122 22 11 | 2793 | 120 47 34 | 2778 | 119 12 37 | 2763 |
| 11 | Sun | W. | 118 27 49 | 3047 | 119 57 3 | 3030 | 121 26 39 | 3012 | 122 56 37 | 2994 |
| | Spica | W. | 55 35 58 | 2698 | 57 12 41 | 2681 | 58 49 46 | 2663 | 60 27 15 | 2647 |
| | Mars | W. | 41 3 17 | 2901 | 42 35 35 | 2883 | 44 8 16 | 2866 | 45 41 19 | 2847 |
| | Fomalhaut | E. | 73 49 31 | 2920 | 72 17 37 | 2907 | 70 45 27 | 2894 | 69 13 1 | 2883 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 2 | Sun | W. | 24 26 11 | 3398 | 25 48 30 | 3398 | 27 10 49 | 3400 | 28 33 6 | 3401 |
| | Spica | E. | 47 8 51 | 2961 | 45 37 49 | 2968 | 44 6 56 | 2976 | 42 36 13 | 2984 |
| | Mars | E. | 56 43 14 | 3165 | 55 16 23 | 3173 | 53 49 42 | 3182 | 52 23 11 | 3189 |
| | Antares | E. | 93 2 1 | 2957 | 91 30 54 | 2965 | 89 59 57 | 2973 | 88 29 10 | 2980 |
| 3 | Sun | W. | 35 23 45 | 3419 | 36 45 40 | 3423 | 38 7 31 | 3426 | 39 29 18 | 3431 |
| | Spica | E. | 35 4 58 | 3019 | 33 35 9 | 3026 | 32 5 28 | 3032 | 30 35 55 | 3038 |
| | Mars | E. | 45 12 50 | 3225 | 43 47 11 | 3232 | 42 21 40 | 3238 | 40 56 16 | 3244 |
| | Antares | E. | 80 57 29 | 3014 | 79 27 33 | 3019 | 77 57 44 | 3026 | 76 28 3 | 3030 |
| 4 | Sun | W. | 46 17 8 | 3448 | 47 38 30 | 3450 | 48 59 50 | 3453 | 50 21 7 | 3455 |
| | Spica | E. | 23 9 57 | 3067 | 21 41 7 | 3072 | 20 12 23 | 3078 | 18 43 46 | 3082 |
| | Mars | E. | 33 50 56 | 3270 | 32 26 9 | 3274 | 31 1 27 | 3277 | 29 36 49 | 3281 |
| | Antares | E. | 69 1 12 | 3056 | 67 32 7 | 3057 | 66 3 5 | 3061 | 64 34 8 | 3065 |
| | α Aquilæ | E. | 115 37 47 | 4114 | 114 27 59 | 4092 | 113 17 50 | 4073 | 112 7 22 | 4055 |
| 5 | Sun | W. | 57 6 58 | 3461 | 58 28 6 | 3461 | 59 49 14 | 3462 | 61 10 21 | 3461 |
| | Mars | E. | 22 34 31 | 3192 | 21 10 10 | 3193 | 19 45 50 | 3294 | 18 21 31 | 3294 |
| | Antares | E. | 57 10 10 | 3074 | 55 41 29 | 3074 | 54 12 48 | 3075 | 52 44 8 | 3074 |
| | α Aquilæ | E. | 106 11 2 | 3981 | 104 59 4 | 3970 | 103 46 55 | 3959 | 102 34 36 | 3948 |
| 6 | Sun | W. | 67 56 17 | 3452 | 69 17 35 | 3447 | 70 38 58 | 3444 | 72 0 25 | 3440 |
| | Antares | E. | 45 20 33 | 3068 | 43 51 44 | 3065 | 42 22 52 | 3062 | 40 53 56 | 3059 |
| | α Aquilæ | E. | 96 30 33 | 3907 | 95 17 20 | 3901 | 94 4 1 | 3894 | 92 50 35 | 3889 |
| 7 | Sun | W. | 78 49 0 | 3412 | 80 11 3 | 3405 | 81 33 14 | 3397 | 82 55 34 | 3388 |
| | Antares | E. | 33 27 59 | 3034 | 31 58 28 | 3027 | 30 28 49 | 3021 | 28 59 2 | 3014 |
| | α Aquilæ | E. | 86 42 11 | 3867 | 85 28 18 | 3863 | 84 14 21 | 3861 | 83 0 22 | 3859 |
| | Fomalhaut | E. | 114 52 30 | 3281 | 113 27 56 | 3269 | 112 3 8 | 3257 | 110 38 6 | 3245 |
| 8 | Sun | W. | 89 49 45 | 3341 | 91 13 8 | 3330 | 92 36 45 | 3319 | 94 0 34 | 3306 |
| | Spica | W. | 24 30 20 | 2978 | 26 1 0 | 2967 | 27 31 54 | 2956 | 29 3 2 | 2945 |
| | Antares | E. | 21 27 42 | 2970 | 19 56 52 | 2961 | 18 25 50 | 2951 | 16 54 36 | 2941 |
| | α Aquilæ | E. | 76 50 12 | 3860 | 75 36 12 | 3861 | 74 22 13 | 3865 | 73 8 18 | 3868 |
| | Fomalhaut | E. | 103 29 22 | 3184 | 102 2 54 | 3172 | 100 36 11 | 3159 | 99 9 13 | 3146 |
| 9 | Sun | W. | 101 3 20 | 3242 | 102 28 40 | 3229 | 103 54 18 | 3212 | 105 20 13 | 3197 |
| | Spica | W. | 36 42 28 | 2882 | 38 15 10 | 2867 | 39 48 11 | 2854 | 41 21 29 | 2840 |
| | Mars | W. | 23 2 17 | 3090 | 24 30 39 | 3076 | 25 59 18 | 3061 | 27 28 15 | 3047 |
| | α Aquilæ | E. | 67 0 4 | 3909 | 65 46 53 | 3921 | 64 33 55 | 3935 | 63 21 11 | 3952 |
| | Fomalhaut | E. | 91 50 29 | 3081 | 90 21 56 | 3067 | 88 53 6 | 3054 | 87 24 0 | 3040 |
| | α Pegasi | E. | 112 43 34 | 3248 | 111 18 22 | 3227 | 109 52 45 | 3206 | 108 26 43 | 3186 |
| 10 | Sun | W. | 112 34 26 | 3117 | 114 2 15 | 3100 | 115 30 25 | 3082 | 116 58 56 | 3065 |
| | Spica | W. | 49 12 46 | 2763 | 50 48 2 | 2747 | 52 23 39 | 2731 | 53 59 38 | 2715 |
| | Mars | W. | 34 57 39 | 2968 | 36 28 32 | 2951 | 37 59 46 | 2935 | 39 31 21 | 2918 |
| | α Aquilæ | E. | 57 22 18 | 4072 | 56 11 49 | 4106 | 55 1 53 | 4145 | 53 52 35 | 4195 |
| | Fomalhaut | E. | 79 54 19 | 2973 | 78 23 33 | 2959 | 76 52 29 | 2946 | 75 21 8 | 2933 |
| | α Pegasi | E. | 101 10 33 | 3087 | 99 42 8 | 3068 | 98 13 19 | 3049 | 96 44 7 | 3031 |
| | Jupiter | E. | 117 37 20 | 2747 | 116 1 42 | 2730 | 114 25 42 | 2716 | 112 49 22 | 2697 |
| 11 | Sun | W. | 124 26 57 | 2975 | 125 57 41 | 2957 | 127 28 47 | 2939 | 129 0 17 | 2921 |
| | Spica | W. | 62 5 6 | 2629 | 63 43 21 | 2612 | 65 22 0 | 2594 | 67 1 3 | 2576 |
| | Mars | W. | 47 14 46 | 2829 | 48 48 36 | 2811 | 50 22 49 | 2793 | 51 57 26 | 2774 |
| | Fomalhaut | E. | 67 40 20 | 2871 | 66 7 24 | 2860 | 64 34 14 | 2849 | 63 0 50 | 2839 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | | | P. L. of Diff. | IIIh. | | | P. L. of Diff. | VIh. | | | P. L. of Diff. | IXh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 11 | α Pegasi | E. | 95 | 14 | 33 | 3018 | 93 | 44 | 36 | 2994 | 92 | 14 | 16 | 2977 | 90 | 43 | 34 | 2957 |
| | Jupiter | E. | 111 | 12 | 38 | 2681 | 109 | 35 | 32 | 2664 | 107 | 58 | 4 | 2647 | 106 | 20 | 13 | 2630 |
| 12 | Spica | W. | 68 | 40 | 31 | 2559 | 70 | 20 | 23 | 2541 | 72 | 0 | 39 | 2523 | 73 | 41 | 20 | 2506 |
| | Mars | W. | 53 | 32 | 28 | 2756 | 55 | 7 | 54 | 2738 | 56 | 43 | 44 | 2719 | 58 | 19 | 59 | 2701 |
| | Antares | W. | 22 | 46 | 0 | 2559 | 24 | 25 | 52 | 2540 | 26 | 6 | 9 | 2522 | 27 | 46 | 51 | 2504 |
| | Fomalhaut | E. | 61 | 27 | 13 | 2830 | 59 | 53 | 24 | 2822 | 58 | 19 | 25 | 2815 | 56 | 45 | 17 | 2808 |
| | α Pegasi | E. | 83 | 4 | 43 | 2878 | 81 | 31 | 56 | 2863 | 79 | 58 | 50 | 2848 | 78 | 25 | 25 | 2835 |
| | Jupiter | E. | 98 | 5 | 2 | 2541 | 96 | 24 | 46 | 2524 | 94 | 44 | 6 | 2506 | 93 | 3 | 1 | 2489 |
| 13 | Spica | W. | 82 | 10 | 56 | 2418 | 83 | 54 | 5 | 2401 | 85 | 37 | 38 | 2384 | 87 | 21 | 35 | 2367 |
| | Mars | W. | 66 | 27 | 18 | 2610 | 68 | 6 | 0 | 2592 | 69 | 45 | 6 | 2574 | 71 | 24 | 36 | 2556 |
| | Antares | W. | 36 | 16 | 33 | 2417 | 37 | 59 | 44 | 2400 | 39 | 43 | 19 | 2383 | 41 | 27 | 18 | 2366 |
| | Fomalhaut | E. | 48 | 53 | 10 | 2801 | 47 | 18 | 44 | 2807 | 45 | 44 | 25 | 2815 | 44 | 10 | 16 | 2825 |
| | α Pegasi | E. | 70 | 34 | 9 | 2777 | 68 | 59 | 11 | 2768 | 67 | 24 | 1 | 2761 | 65 | 48 | 42 | 2755 |
| | Jupiter | E. | 84 | 31 | 26 | 2401 | 82 | 47 | 52 | 2382 | 81 | 3 | 53 | 2366 | 79 | 19 | 29 | 2349 |
| | α Arietis | E. | 112 | 0 | 35 | 2469 | 110 | 18 | 38 | 2450 | 108 | 36 | 15 | 2433 | 106 | 53 | 27 | 2415 |
| 14 | Spica | W. | 96 | 7 | 20 | 2288 | 97 | 53 | 37 | 2273 | 99 | 40 | 16 | 2259 | 101 | 27 | 16 | 2244 |
| | Mars | W. | 79 | 47 | 57 | 2475 | 81 | 29 | 46 | 2460 | 83 | 11 | 56 | 2444 | 84 | 54 | 28 | 2430 |
| | Antares | W. | 50 | 13 | 12 | 2286 | 51 | 59 | 32 | 2272 | 53 | 46 | 13 | 2257 | 55 | 33 | 16 | 2243 |
| | α Pegasi | E. | 57 | 50 | 41 | 2747 | 56 | 15 | 4 | 2751 | 54 | 39 | 32 | 2759 | 53 | 4 | 10 | 2769 |
| | Jupiter | E. | 70 | 31 | 32 | 2271 | 68 | 44 | 50 | 2257 | 66 | 57 | 47 | 2242 | 65 | 10 | 22 | 2227 |
| | α Arietis | E. | 98 | 13 | 18 | 2333 | 96 | 28 | 6 | 2317 | 94 | 42 | 31 | 2302 | 92 | 56 | 34 | 2288 |
| 15 | Spica | W. | 110 | 27 | 24 | 2180 | 112 | 16 | 21 | 2169 | 114 | 5 | 35 | 2159 | 115 | 55 | 5 | 2148 |
| | Mars | W. | 93 | 32 | 6 | 2364 | 95 | 16 | 33 | 2352 | 97 | 1 | 17 | 2341 | 98 | 46 | 17 | 2331 |
| | Antares | W. | 64 | 33 | 34 | 2178 | 66 | 22 | 34 | 2168 | 68 | 11 | 50 | 2157 | 70 | 1 | 23 | 2147 |
| | α Pegasi | E. | 45 | 12 | 8 | 2876 | 43 | 39 | 18 | 2912 | 42 | 7 | 15 | 2957 | 40 | 36 | 8 | 3009 |
| | Jupiter | E. | 56 | 8 | 4 | 2162 | 54 | 18 | 39 | 2151 | 52 | 28 | 57 | 2140 | 50 | 38 | 59 | 2130 |
| | α Arietis | E. | 84 | 1 | 53 | 2225 | 82 | 14 | 3 | 2214 | 80 | 25 | 57 | 2204 | 78 | 37 | 35 | 2194 |
| | Aldebaran | E. | 114 | 32 | 18 | 2249 | 112 | 45 | 3 | 2237 | 110 | 57 | 30 | 2224 | 109 | 9 | 38 | 2212 |
| 16 | Mars | W. | 107 | 34 | 48 | 2287 | 109 | 21 | 6 | 2281 | 111 | 7 | 34 | 2274 | 112 | 54 | 11 | 2269 |
| | Antares | W. | 79 | 12 | 41 | 2105 | 81 | 3 | 33 | 2098 | 82 | 54 | 35 | 2092 | 84 | 45 | 46 | 2086 |
| | α Aquilæ | W. | 42 | 22 | 37 | 4610 | 43 | 24 | 53 | 4483 | 44 | 29 | 45 | 4271 | 45 | 37 | 4 | 4127 |
| | Jupiter | E. | 41 | 25 | 36 | 2088 | 39 | 34 | 18 | 2081 | 37 | 42 | 49 | 2075 | 35 | 51 | 12 | 2071 |
| | α Arietis | E. | 69 | 32 | 29 | 2157 | 67 | 42 | 56 | 2151 | 65 | 53 | 15 | 2147 | 64 | 3 | 28 | 2143 |
| | Aldebaran | E | 100 | 6 | 19 | 2165 | 98 | 16 | 59 | 2158 | 96 | 27 | 28 | 2151 | 94 | 37 | 47 | 2146 |
| 17 | Antares | W. | 94 | 3 | 27 | 2070 | 95 | 55 | 12 | 2068 | 97 | 47 | 0 | 2068 | 99 | 38 | 49 | 2068 |
| | α Aquilæ | W. | 51 | 44 | 32 | 3599 | 53 | 3 | 7 | 3525 | 54 | 23 | 4 | 3456 | 55 | 44 | 17 | 3394 |
| | α Arietis | E. | 54 | 53 | 37 | 2139 | 53 | 3 | 37 | 2141 | 51 | 13 | 41 | 2144 | 49 | 23 | 49 | 2149 |
| | Aldebaran | E. | 85 | 27 | 42 | 2130 | 83 | 37 | 28 | 2129 | 81 | 47 | 13 | 2128 | 79 | 56 | 57 | 2129 |
| | Saturn | E. | 118 | 0 | 15 | 2128 | 116 | 9 | 59 | 2126 | 114 | 19 | 39 | 2124 | 112 | 29 | 17 | 2124 |
| 18 | α Aquilæ | W. | 62 | 45 | 43 | 3173 | 64 | 12 | 25 | 3143 | 65 | 39 | 43 | 3114 | 67 | 7 | 35 | 3090 |
| | Fomalhaut | W. | 31 | 12 | 41 | 2918 | 32 | 44 | 37 | 2841 | 34 | 18 | 12 | 2775 | 35 | 53 | 12 | 2720 |
| | α Arietis | E. | 40 | 16 | 47 | 2190 | 38 | 28 | 4 | 2203 | 36 | 39 | 41 | 2219 | 34 | 51 | 42 | 2237 |
| | Aldebaran | E. | 70 | 46 | 16 | 2144 | 68 | 56 | 24 | 2149 | 67 | 6 | 39 | 2155 | 65 | 17 | 4 | 2162 |
| | Saturn | E. | 103 | 17 | 31 | 2130 | 101 | 27 | 17 | 2133 | 99 | 37 | 8 | 2137 | 97 | 47 | 5 | 2141 |
| | Pollux | E. | 114 | 19 | 35 | 2079 | 112 | 28 | 3 | 2081 | 110 | 36 | 35 | 2085 | 108 | 45 | 12 | 2090 |
| 19 | α Aquilæ | W. | 74 | 32 | 42 | 3020 | 76 | 2 | 30 | 3014 | 77 | 32 | 26 | 3009 | 79 | 2 | 28 | 3006 |
| | Fomalhaut | W. | 44 | 3 | 7 | 2552 | 45 | 43 | 8 | 2534 | 47 | 23 | 34 | 2518 | 49 | 4 | 22 | 2507 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 11 | α Pegasi | E. | 89 12 30 | 2942 | 87 41 4 | 2926 | 86 9 18 | 2909 | 84 37 10 | 2894 |
| | Jupiter | E. | 104 41 59 | 2612 | 103 3 21 | 2595 | 101 24 19 | 2577 | 99 44 53 | 2559 |
| 12 | Spica | W. | 75 22 25 | 2487 | 77 3 56 | 2470 | 78 45 51 | 2452 | 80 28 11 | 2435 |
| | Mars | W. | 59 56 38 | 2683 | 61 33 41 | 2664 | 63 11 9 | 2646 | 64 49 1 | 2628 |
| | Antares | W. | 29 27 58 | 2487 | 31 9 30 | 2470 | 32 51 26 | 2452 | 34 33 47 | 2434 |
| | Fomalhaut | E. | 55 11 0 | 2804 | 53 36 37 | 2800 | 52 2 9 | 2798 | 50 27 39 | 2799 |
| | α Pegasi | E. | 76 51 42 | 2821 | 75 17 41 | 2809 | 73 43 25 | 2798 | 72 8 54 | 2787 |
| | Jupiter | E. | 91 21 32 | 2471 | 89 39 38 | 2453 | 87 57 19 | 2436 | 86 14 35 | 2418 |
| 13 | Spica | W. | 89 5 57 | 2350 | 90 50 43 | 2335 | 92 35 52 | 2318 | 94 21 25 | 2303 |
| | Mars | W. | 73 4 29 | 2540 | 74 44 46 | 2523 | 76 25 27 | 2507 | 78 6 31 | 2491 |
| | Antares | W. | 43 11 42 | 2349 | 44 56 30 | 2333 | 46 41 41 | 2317 | 48 27 15 | 2302 |
| | Fomalhaut | E. | 42 36 21 | 2840 | 41 2 45 | 2860 | 39 29 35 | 2885 | 37 56 57 | 2917 |
| | α Pegasi | E. | 64 13 15 | 2750 | 62 37 41 | 2746 | 61 2 2 | 2745 | 59 26 22 | 2744 |
| | Jupiter | E. | 77 34 41 | 2332 | 75 49 28 | 2316 | 74 3 52 | 2300 | 72 17 53 | 2285 |
| | α Arietis | E. | 105 10 14 | 2898 | 103 26 36 | 2380 | 101 42 33 | 2364 | 99 58 7 | 2348 |
| 14 | Spica | W. | 103 14 38 | 2230 | 105 2 21 | 2217 | 106 50 23 | 2204 | 108 38 44 | 2192 |
| | Mars | W. | 86 37 20 | 2415 | 88 20 33 | 2401 | 90 4 6 | 2389 | 91 47 57 | 2376 |
| | Antares | W. | 57 20 40 | 2229 | 59 8 25 | 2216 | 60 56 29 | 2203 | 62 44 52 | 2190 |
| | α Pegasi | E. | 51 29 1 | 2782 | 49 54 10 | 2798 | 48 19 40 | 2820 | 46 45 38 | 2845 |
| | Jupiter | E. | 63 22 35 | 2213 | 61 34 27 | 2200 | 59 45 59 | 2186 | 57 57 11 | 2174 |
| | α Arietis | E. | 91 10 17 | 2274 | 89 23 39 | 2261 | 87 36 42 | 2248 | 85 49 26 | 2237 |
| 15 | Spica | W. | 117 44 51 | 2139 | 119 34 51 | 2130 | 121 25 5 | 2121 | 123 15 32 | 2114 |
| | Mars | W. | 100 31 32 | 2321 | 102 17 1 | 2311 | 104 2 44 | 2302 | 105 48 40 | 2294 |
| | Antares | W. | 71 51 11 | 2137 | 73 41 14 | 2128 | 75 31 31 | 2120 | 77 22 0 | 2112 |
| | α Pegasi | E. | 39 6 6 | 3070 | 37 37 20 | 3143 | 36 10 2 | 3229 | 34 44 27 | 3329 |
| | Jupiter | E. | 48 48 46 | 2120 | 46 58 18 | 2112 | 45 7 37 | 2103 | 43 16 42 | 2096 |
| | α Arietis | E. | 76 48 58 | 2185 | 75 0 8 | 2177 | 73 11 6 | 2170 | 71 21 53 | 2163 |
| | Aldebaran | E. | 107 21 29 | 2201 | 105 33 3 | 2191 | 103 44 22 | 2182 | 101 55 27 | 2173 |
| 16 | Mars | W. | 114 40 56 | 2264 | 116 27 48 | 2261 | 118 14 45 | 2257 | 120 1 48 | 2254 |
| | Antares | W. | 86 37 6 | 2082 | 88 28 33 | 2078 | 90 20 6 | 2074 | 92 11 45 | 2072 |
| | α Aquilæ | W. | 46 46 40 | 3998 | 47 58 22 | 3881 | 49 12 1 | 3776 | 50 27 28 | 3681 |
| | Jupiter | E. | 33 59 28 | 2066 | 32 7 37 | 2061 | 30 15 38 | 2058 | 28 23 34 | 2056 |
| | α Arietis | E. | 62 13 35 | 2141 | 60 23 38 | 2139 | 58 33 39 | 2138 | 56 43 38 | 2138 |
| | Aldebaran | E. | 92 47 58 | 2141 | 90 58 2 | 2137 | 89 8 0 | 2134 | 87 17 53 | 2132 |
| 17 | Antares | W. | 101 30 38 | 2068 | 103 22 27 | 2069 | 105 14 14 | 2071 | 107 5 58 | 2073 |
| | α Aquilæ | W. | 57 6 40 | 3338 | 58 30 7 | 3291 | 59 54 29 | 3247 | 61 19 43 | 3208 |
| | α Arietis | E. | 47 34 4 | 2155 | 45 44 28 | 2161 | 43 55 1 | 2169 | 42 5 47 | 2178 |
| | Aldebaran | E. | 78 6 42 | 2131 | 76 16 30 | 2132 | 74 26 20 | 2136 | 72 36 15 | 2139 |
| | Saturn | E. | 110 38 54 | 2123 | 108 48 30 | 2124 | 106 58 8 | 2126 | 105 7 48 | 2128 |
| 18 | α Aquilæ | W. | 68 35 54 | 3072 | 70 4 38 | 3055 | 71 33 43 | 3041 | 73 3 5 | 3030 |
| | Fomalhaut | W. | 37 29 25 | 2674 | 39 6 40 | 2635 | 40 44 47 | 2603 | 42 23 38 | 2575 |
| | α Arietis | E. | 33 4 9 | 2257 | 31 17 6 | 2281 | 29 30 38 | 2309 | 27 44 52 | 2342 |
| | Aldebaran | E. | 63 27 39 | 2170 | 61 38 26 | 2177 | 59 49 25 | 2188 | 58 0 38 | 2197 |
| | Saturn | E. | 95 57 9 | 2146 | 94 7 20 | 2152 | 92 17 40 | 2159 | 90 28 10 | 2165 |
| | Pollux | E. | 106 53 57 | 2095 | 105 2 50 | 2101 | 103 11 52 | 2107 | 101 21 3 | 2114 |
| 19 | α Aquilæ | W. | 80 32 33 | 3005 | 82 2 39 | 3008 | 83 32 41 | 3012 | 85 2 39 | 3018 |
| | Fomalhaut | W. | 50 45 26 | 2497 | 52 26 44 | 2489 | 54 8 12 | 2484 | 55 49 48 | 2481 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. ° ′ ″ | P. L. of Diff. | IIIh. ° ′ ″ | P. L. of Diff. | VIh. ° ′ ″ | P. L. of Diff. | IXh. ° ′ ″ | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | Aldebaran | E. | 56 12 6 | 2208 | 54 23 50 | 2220 | 52 35 53 | 2233 | 50 48 14 | 2247 |
| | Saturn | E. | 88 38 50 | 2172 | 86 49 40 | 2180 | 85 0 42 | 2188 | 83 11 56 | 2197 |
| | Pollux | E. | 99 30 25 | 2121 | 97 39 58 | 2129 | 95 49 43 | 2137 | 93 59 40 | 2145 |
| 20 | α Aquilæ | W. | 86 32 30 | 3025 | 88 2 12 | 3032 | 89 31 45 | 3043 | 91 1 5 | 3056 |
| | Fomalhaut | W. | 57 31 28 | 2480 | 59 13 10 | 2480 | 60 54 52 | 2480 | 62 36 33 | 2482 |
| | α Pegasi | W. | 38 46 42 | 3068 | 40 15 31 | 3016 | 41 45 24 | 2971 | 43 16 13 | 2932 |
| | Jupiter | W. | 18 4 7 | 2174 | 19 53 13 | 2184 | 21 42 4 | 2194 | 23 30 40 | 2205 |
| | Aldebaran | E. | 41 55 36 | 2333 | 40 10 24 | 2355 | 38 25 45 | 2378 | 36 41 39 | 2403 |
| | Saturn | E. | 74 11 38 | 2247 | 72 24 20 | 2258 | 70 37 18 | 2269 | 68 50 33 | 2281 |
| | Pollux | E. | 84 52 47 | 2193 | 83 4 9 | 2203 | 81 15 46 | 2214 | 79 27 40 | 2225 |
| | Sun | E. | 121 17 42 | 2504 | 119 36 35 | 2515 | 117 55 43 | 2526 | 116 15 6 | 2538 |
| 21 | α Aquilæ | W. | 98 23 21 | 3138 | 99 50 44 | 3161 | 101 17 40 | 3184 | 102 44 8 | 3209 |
| | Fomalhaut | W. | 71 3 36 | 2510 | 72 44 35 | 2518 | 74 25 23 | 2527 | 76 5 59 | 2535 |
| | α Pegasi | W. | 51 0 12 | 2816 | 52 34 19 | 2804 | 54 8 42 | 2794 | 55 43 18 | 2786 |
| | Jupiter | W. | 32 29 38 | 2261 | 34 16 35 | 2273 | 36 3 15 | 2285 | 37 49 37 | 2297 |
| | Saturn | E. | 60 1 17 | 2344 | 58 16 21 | 2357 | 56 31 45 | 2371 | 54 47 29 | 2384 |
| | Pollux | E. | 70 31 24 | 2284 | 68 45 1 | 2296 | 66 58 56 | 2309 | 65 13 9 | 2322 |
| | Sun | E. | 107 56 9 | 2599 | 106 17 13 | 2612 | 104 38 34 | 2625 | 103 0 13 | 2638 |
| 22 | α Aquilæ | W. | 109 48 31 | 3359 | 111 11 34 | 3395 | 112 33 56 | 3434 | 113 55 34 | 3474 |
| | Fomalhaut | W. | 84 25 39 | 2588 | 86 4 50 | 2600 | 87 43 45 | 2612 | 89 22 23 | 2625 |
| | α Pegasi | W. | 63 37 59 | 2775 | 65 12 58 | 2776 | 66 47 57 | 2779 | 68 22 52 | 2783 |
| | Jupiter | W. | 46 36 57 | 2359 | 48 21 31 | 2371 | 50 5 47 | 2384 | 51 49 45 | 2396 |
| | α Arietis | W. | 20 0 25 | 2768 | 21 35 35 | 2727 | 23 11 39 | 2696 | 24 48 24 | 2672 |
| | Saturn | E. | 46 11 10 | 2456 | 44 28 58 | 2474 | 42 47 8 | 2489 | 41 5 40 | 2506 |
| | Pollux | E. | 56 28 49 | 2385 | 54 44 52 | 2398 | 53 1 14 | 2410 | 51 17 54 | 2423 |
| | Sun | E. | 94 52 55 | 2706 | 93 16 22 | 2718 | 91 40 6 | 2732 | 90 4 9 | 2745 |
| 23 | Fomalhaut | W. | 97 31 11 | 2692 | 99 8 1 | 2706 | 100 44 33 | 2721 | 102 20 45 | 2735 |
| | α Pegasi | W. | 76 15 49 | 2815 | 77 49 58 | 2823 | 79 23 56 | 2831 | 80 57 43 | 2840 |
| | Jupiter | W. | 60 25 9 | 2458 | 62 7 21 | 2470 | 63 49 17 | 2482 | 65 30 56 | 2494 |
| | α Arietis | W. | 32 57 23 | 2682 | 34 35 35 | 2632 | 36 13 46 | 2634 | 37 51 55 | 2637 |
| | Saturn | E. | 32 44 13 | 2596 | 31 5 12 | 2616 | 29 26 39 | 2638 | 27 48 36 | 2662 |
| | Pollux | E. | 42 45 43 | 2487 | 41 4 11 | 2499 | 39 22 56 | 2511 | 37 41 58 | 2524 |
| | Sun | E. | 82 8 48 | 2813 | 80 34 37 | 2826 | 79 0 43 | 2839 | 77 27 6 | 2852 |
| 24 | Fomalhaut | W. | 110 16 42 | 2815 | 111 50 50 | 2832 | 113 24 36 | 2850 | 114 57 59 | 2867 |
| | α Pegasi | W. | 88 43 33 | 2892 | 90 16 2 | 2904 | 91 48 16 | 2916 | 93 20 15 | 2928 |
| | Jupiter | W. | 73 55 3 | 2552 | 75 35 4 | 2563 | 77 14 50 | 2574 | 78 54 20 | 2585 |
| | α Arietis | W. | 46 1 16 | 2662 | 47 38 45 | 2671 | 49 16 4 | 2678 | 50 53 13 | 2686 |
| | Pollux | E. | 29 21 29 | 2585 | 27 42 14 | 2597 | 26 3 15 | 2610 | 24 24 33 | 2622 |
| | Sun | E. | 69 43 11 | 2916 | 68 11 13 | 2929 | 66 39 31 | 2942 | 65 8 5 | 2954 |
| 25 | α Pegasi | W. | 100 56 11 | 2994 | 102 26 31 | 3009 | 103 56 33 | 3023 | 105 26 17 | 3039 |
| | Jupiter | W. | 87 8 10 | 2638 | 88 46 13 | 2648 | 90 24 2 | 2658 | 92 1 38 | 2668 |
| | α Arietis | W. | 58 56 20 | 2726 | 60 32 25 | 2735 | 62 8 18 | 2744 | 63 44 0 | 2752 |
| | Sun | E. | 57 34 38 | 3014 | 56 4 42 | 3025 | 54 35 0 | 3035 | 53 5 31 | 3047 |
| 26 | Jupiter | W. | 100 6 24 | 2716 | 101 42 43 | 2725 | 103 18 50 | 2734 | 104 54 46 | 2742 |
| | α Arietis | W. | 71 39 43 | 2795 | 73 14 18 | 2802 | 74 48 43 | 2811 | 76 22 56 | 2819 |
| | Sun | E. | 45 41 34 | 3101 | 44 13 26 | 3113 | 42 45 32 | 3124 | 41 17 51 | 3134 |
| 27 | Sun | E. | 34 2 36 | 3187 | 32 36 11 | 3198 | 31 10 0 | 3209 | 29 44 2 | 3220 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 19 | Aldebaran | E. | 49 0 56 | 2262 | 47 14 1 | 2277 | 45 27 27 | 2294 | 43 41 18 | 2312 |
| | Saturn | E. | 81 23 24 | 2206 | 79 35 5 | 2216 | 77 47 1 | 2226 | 75 59 12 | 2236 |
| | Pollux | E. | 92 9 49 | 2154 | 90 20 12 | 2163 | 88 30 49 | 2173 | 86 41 41 | 2182 |
| 20 | α Aquilæ | W. | 92 30 10 | 3069 | 93 58 58 | 3084 | 95 27 27 | 3101 | 96 55 35 | 3119 |
| | Fomalhaut | W. | 64 18 11 | 2487 | 65 59 43 | 2491 | 67 41 9 | 2497 | 69 22 27 | 2503 |
| | α Pegasi | W. | 44 47 51 | 2900 | 46 20 10 | 2873 | 47 53 3 | 2851 | 49 26 25 | 2831 |
| | Jupiter | W. | 25 19 0 | 2216 | 27 7 4 | 2227 | 28 54 52 | 2237 | 30 42 24 | 2249 |
| | Aldebaran | E. | 34 58 9 | 2431 | 33 15 18 | 2463 | 31 33 13 | 2499 | 29 51 58 | 2538 |
| | Saturn | E. | 67 4 6 | 2294 | 65 17 57 | 2305 | 63 32 5 | 2317 | 61 46 31 | 2331 |
| | Pollux | E. | 77 39 50 | 2237 | 75 52 17 | 2249 | 74 5 2 | 2260 | 72 18 4 | 2272 |
| | Sun | E. | 114 34 46 | 2550 | 112 54 42 | 2561 | 111 14 54 | 2574 | 109 35 23 | 2586 |
| 21 | α Aquilæ | W. | 104 10 7 | 3236 | 105 35 34 | 3263 | 107 0 29 | 3294 | 108 24 48 | 3325 |
| | Fomalhaut | W. | 77 46 23 | 2545 | 79 26 33 | 2555 | 81 6 30 | 2566 | 82 46 12 | 2577 |
| | α Pegasi | W. | 57 18 4 | 2780 | 58 52 58 | 2777 | 60 27 56 | 2775 | 62 2 57 | 2774 |
| | Jupiter | W. | 39 35 41 | 2309 | 41 21 27 | 2322 | 43 6 55 | 2334 | 44 52 5 | 2346 |
| | Saturn | E. | 53 3 32 | 2398 | 51 19 55 | 2413 | 49 36 39 | 2428 | 47 53 44 | 2443 |
| | Pollux | E. | 63 27 41 | 2334 | 61 42 30 | 2346 | 59 57 38 | 2359 | 58 13 4 | 2372 |
| | Sun | E. | 101 22 9 | 2651 | 99 44 23 | 2665 | 98 6 56 | 2678 | 96 29 47 | 2691 |
| 22 | α Aquilæ | W. | 115 16 27 | 3516 | 116 36 33 | 3561 | 117 55 50 | 3609 | 119 14 15 | 3664 |
| | Fomalhaut | W. | 91 0 44 | 2638 | 92 38 48 | 2651 | 94 16 34 | 2664 | 95 54 2 | 2678 |
| | α Pegasi | W. | 69 57 42 | 2788 | 71 32 26 | 2794 | 73 7 2 | 2800 | 74 41 30 | 2807 |
| | Jupiter | W. | 53 33 25 | 2409 | 55 16 47 | 2421 | 56 59 52 | 2433 | 58 42 39 | 2445 |
| | α Arietis | W. | 26 25 41 | 2657 | 28 3 19 | 2646 | 29 41 12 | 2638 | 31 19 15 | 2635 |
| | Saturn | E. | 39 24 35 | 2522 | 37 43 53 | 2540 | 36 3 35 | 2557 | 34 23 41 | 2576 |
| | Pollux | E. | 49 34 52 | 2435 | 47 52 7 | 2448 | 46 9 41 | 2461 | 44 27 33 | 2474 |
| | Sun | E. | 88 28 29 | 2759 | 86 53 7 | 2772 | 85 18 3 | 2786 | 83 43 17 | 2799 |
| 23 | Fomalhaut | W. | 103 56 38 | 2751 | 105 32 10 | 2767 | 107 7 21 | 2782 | 108 42 12 | 2798 |
| | α Pegasi | W. | 82 31 19 | 2849 | 84 4 43 | 2860 | 85 37 53 | 2870 | 87 10 50 | 2881 |
| | Jupiter | W. | 67 12 18 | 2505 | 68 53 24 | 2517 | 70 34 13 | 2529 | 72 14 46 | 2540 |
| | α Arietis | W. | 39 30 0 | 2640 | 41 8 0 | 2646 | 42 45 53 | 2651 | 44 23 39 | 2657 |
| | Saturn | E. | 26 11 5 | 2688 | 24 34 9 | 2716 | 22 57 51 | 2749 | 21 22 16 | 2787 |
| | Pollux | E. | 36 1 18 | 2536 | 34 20 56 | 2548 | 32 40 50 | 2561 | 31 1 1 | 2573 |
| | Sun | E. | 75 53 46 | 2866 | 74 20 43 | 2878 | 72 47 56 | 2891 | 71 15 25 | 2904 |
| 24 | Fomalhaut | W. | 116 31 0 | 2886 | 118 3 37 | 2905 | 119 35 49 | 2925 | 121 7 36 | 2946 |
| | α Pegasi | W. | 94 51 58 | 2940 | 96 23 26 | 2953 | 97 54 38 | 2966 | 99 25 33 | 2980 |
| | Jupiter | W. | 80 33 35 | 2596 | 82 12 35 | 2607 | 83 51 21 | 2617 | 85 29 52 | 2627 |
| | α Arietis | W. | 52 30 12 | 2694 | 54 7 0 | 2702 | 55 43 38 | 2710 | 57 20 4 | 2718 |
| | Pollux | E. | 22 46 8 | 2635 | 21 8 0 | 2648 | 19 30 10 | 2661 | 17 52 38 | 2674 |
| | Sun | E. | 63 36 54 | 2965 | 62 5 58 | 2977 | 60 35 16 | 2989 | 59 4 50 | 3001 |
| 25 | α Pegasi | W. | 106 55 42 | 3054 | 108 24 48 | 3071 | 109 53 35 | 3088 | 111 21 57 | 3105 |
| | Jupiter | W. | 93 39 1 | 2678 | 95 16 11 | 2687 | 96 53 8 | 2697 | 98 29 52 | 2706 |
| | α Arietis | W. | 65 19 31 | 2761 | 66 54 50 | 2769 | 68 29 59 | 2778 | 70 4 58 | 2785 |
| | Sun | E. | 51 36 16 | 3058 | 50 7 15 | 3069 | 48 38 28 | 3081 | 47 9 55 | 3091 |
| 26 | Jupiter | W. | 106 30 30 | 2751 | 108 6 2 | 2760 | 109 41 23 | 2768 | 111 16 33 | 2776 |
| | α Arietis | W. | 77 56 59 | 2828 | 79 30 50 | 2836 | 81 4 31 | 2844 | 82 38 2 | 2852 |
| | Sun | E. | 39 50 23 | 3144 | 38 23 7 | 3155 | 36 56 4 | 3166 | 35 29 14 | 3176 |
| 27 | Sun | E. | 28 18 17 | 3232 | 26 52 46 | 3244 | 25 27 29 | 3256 | 24 2 26 | 3268 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S Apparent Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S Apparent Declination. | THE SUN'S Diff. for 1 hour. | THE SUN'S Semi-diameter. | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Mon. | 1 | 10 43 4.75 | 9.074 | N. 8 8 5.5 | 54.66 | 15 53.85 | 64.40 | 0 15.14 | 0.783 |
| Tues. | 2 | 10 46 42.32 | 9.061 | 7 46 10.1 | 54.97 | 15 54.08 | 64.36 | 0 34.09 | 0.794 |
| Wed. | 3 | 10 50 19.60 | 9.049 | 7 24 7.2 | 55.29 | 15 54.32 | 64.32 | 0 53.31 | 0.805 |
| Thur. | 4 | 10 53 56.60 | 9.038 | 7 1 57.2 | 55.57 | 15 54.58 | 64.28 | 1 12.81 | 0.816 |
| Fri. | 5 | 10 57 33.36 | 9.029 | 6 39 40.4 | 55.85 | 15 54.83 | 64.25 | 1 32.54 | 0.827 |
| Sat. | 6 | 11 1 9.91 | 9.020 | 6 17 17.0 | 56.10 | 15 55.08 | 64.22 | 1 52.49 | 0.837 |
| *Sun.* | 7 | 11 4 46.22 | 9.011 | 5 54 47.5 | 56.36 | 15 55.33 | 64.19 | 2 12.69 | 0.845 |
| Mon. | 8 | 11 8 22.31 | 9.003 | 5 32 12.4 | 56.59 | 15 55.58 | 64.16 | 2 33.09 | 0.853 |
| Tues. | 9 | 11 11 58.22 | 8.996 | 5 9 31.8 | 56.82 | 15 55.84 | 64.14 | 2 53.68 | 0.860 |
| Wed. | 10 | 11 15 34.00 | 8.990 | 4 46 45.9 | 57.02 | 15 56.10 | 64.12 | 3 14.39 | 0.866 |
| Thur. | 11 | 11 19 9.63 | 8.985 | 4 23 55.4 | 57.22 | 15 56.36 | 64.11 | 3 35.27 | 0.870 |
| Fri. | 12 | 11 22 45.14 | 8.980 | 4 1 0.3 | 57.39 | 15 56.62 | 64.09 | 3 56.26 | 0.875 |
| Sat. | 13 | 11 26 20.57 | 8.976 | 3 38 1.0 | 57.57 | 15 56.88 | 64.08 | 4 17.32 | 0.879 |
| *Sun.* | 14 | 11 29 55.92 | 8.973 | 3 14 57.7 | 57.71 | 15 57.14 | 64.07 | 4 38.47 | 0.882 |
| Mon. | 15 | 11 33 31.24 | 8.973 | 2 51 50.9 | 57.86 | 15 57.40 | 64.06 | 4 59.65 | 0.883 |
| Tues. | 16 | 11 37 6.52 | 8.973 | 2 28 40.8 | 57.99 | 15 57.66 | 64.06 | 5 20.86 | 0.883 |
| Wed. | 17 | 11 40 41.81 | 8.973 | 2 5 27.6 | 58.12 | 15 57.92 | 64.06 | 5 42.08 | 0.883 |
| Thur. | 18 | 11 44 17.11 | 8.974 | 1 42 11.8 | 58.22 | 15 58.18 | 64.06 | 6 3.28 | 0.882 |
| Fri. | 19 | 11 47 52.45 | 8.977 | 1 18 53.6 | 58.32 | 15 58.44 | 64.06 | 6 24.43 | 0.880 |
| Sat. | 20 | 11 51 27.86 | 8.980 | 0 55 33.4 | 58.38 | 15 58.70 | 64.07 | 6 45.50 | 0.877 |
| *Sun.* | 21 | 11 55 3.37 | 8.985 | 0 32 11.5 | 58.45 | 15 58.96 | 64.09 | 7 6.49 | 0.872 |
| Mon. | 22 | 11 58 38.98 | 8.989 | N. 0 8 48.2 | 58.50 | 15 59.23 | 64.10 | 7 27.39 | 0.867 |
| Tues. | 23 | 12 2 14.71 | 8.994 | S. 0 14 36.2 | 58.55 | 15 59.50 | 64.12 | 7 48.14 | 0.862 |
| Wed. | 24 | 12 5 50.61 | 9.001 | 0 38 1.5 | 58.56 | 15 59.77 | 64.14 | 8 8.74 | 0.856 |
| Thur. | 25 | 12 9 26.68 | 9.008 | 1 1 27.0 | 58.57 | 16 0.04 | 64.16 | 8 29.16 | 0.849 |
| Fri. | 26 | 12 13 2.94 | 9.016 | 1 24 52.5 | 58.56 | 16 0.31 | 64.19 | 8 49.40 | 0.841 |
| Sat. | 27 | 12 16 39.39 | 9.026 | 1 48 17.5 | 58.55 | 16 0.58 | 64.22 | 9 9.44 | 0.830 |
| *Sun.* | 28 | 12 20 16.09 | 9.035 | 2 11 41.9 | 58.50 | 16 0.85 | 64.25 | 9 29.25 | 0.821 |
| Mon. | 29 | 12 23 53.01 | 9.046 | 2 35 5.3 | 58.45 | 16 1.13 | 64.29 | 9 48.82 | 0.811 |
| Tues. | 30 | 12 27 30.20 | 9.057 | 2 58 27.2 | 58.37 | 16 1.40 | 64.33 | 10 8.13 | 0.800 |
| Wed. | 31 | 12 31 7.67 | 9.069 | S. 3 21 47.1 | 58.29 | 16 1.68 | 64.38 | 10 27.17 | 0.788 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | Equation of Time, *to be added to Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Mon. | 1 | 10 43 4.79 | 9.074 | N. 8 8 5.3 | 54.66 | 0 15.16 | 0.783 | 10 43 19.95 |
| Tues. | 2 | 10 46 42.40 | 9.061 | 7 46 9.6 | 54.97 | 0 34.11 | 0.794 | 10 47 16.51 |
| Wed. | 3 | 10 50 19.73 | 9.049 | 7 24 6.4 | 55.29 | 0 53.33 | 0.805 | 10 51 13.06 |
| Thur. | 4 | 10 53 56.78 | 9.038 | 7 1 56.1 | 55.57 | 1 12.84 | 0.816 | 10 55 9.62 |
| Fri. | 5 | 10 57 33.59 | 9.029 | 6 39 39.0 | 55.85 | 1 32.58 | 0.827 | 10 59 6.17 |
| Sat. | 6 | 11 1 10.19 | 9.020 | 6 17 15.3 | 56.10 | 1 52.53 | 0.837 | 11 3 2.72 |
| *Sun.* | 7 | 11 4 46.55 | 9.011 | 5 54 45.5 | 56.36 | 2 12.73 | 0.845 | 11 6 59.28 |
| Mon. | 8 | 11 8 22.70 | 9.003 | 5 32 10.0 | 56.59 | 2 33.14 | 0.853 | 11 10 55.84 |
| Tues. | 9 | 11 11 58.66 | 8.996 | 5 9 29.1 | 56.82 | 2 53.72 | 0.860 | 11 14 52.39 |
| Wed. | 10 | 11 15 34.49 | 8.990 | 4 46 42.9 | 57.02 | 3 14.45 | 0.866 | 11 18 48.94 |
| Thur. | 11 | 11 19 10.17 | 8.985 | 4 23 52.0 | 57.22 | 3 35.33 | 0.870 | 11 22 45.50 |
| Fri. | 12 | 11 22 45.73 | 8.980 | 4 0 56.5 | 57.39 | 3 56.32 | 0.875 | 11 26 42.05 |
| Sat. | 13 | 11 26 21.21 | 8.976 | 3 37 56.9 | 57.57 | 4 17.39 | 0.879 | 11 30 38.60 |
| *Sun.* | 14 | 11 29 56.61 | 8.973 | 3 14 53.3 | 57.71 | 4 38.55 | 0.882 | 11 34 35.16 |
| Mon. | 15 | 11 33 31.98 | 8.973 | 2 51 46.2 | 57.86 | 4 59.73 | 0.883 | 11 38 31.71 |
| Tues. | 16 | 11 37 7.31 | 8.973 | 2 28 35.7 | 57.99 | 5 20.95 | 0.883 | 11 42 28.26 |
| Wed. | 17 | 11 40 42.65 | 8.973 | 2 5 22.2 | 58.12 | 5 42.17 | 0.883 | 11 46 24.82 |
| Thur. | 18 | 11 44 18.01 | 8.974 | 1 42 6.1 | 58.22 | 6 3.36 | 0.882 | 11 50 21.37 |
| Fri. | 19 | 11 47 53.40 | 8.977 | 1 18 47.6 | 58.32 | 6 24.53 | 0.880 | 11 54 17.93 |
| Sat. | 20 | 11 51 28.87 | 8.980 | 0 55 27.0 | 58.38 | 6 45.61 | 0.877 | 11 58 14.48 |
| *Sun.* | 21 | 11 55 4.43 | 8.985 | 0 32 4.7 | 58.45 | 7 6.60 | 0.872 | 12 2 11.03 |
| Mon. | 22 | 11 58 40.09 | 8.989 | N. 0 8 41.1 | 58.50 | 7 27.50 | 0.867 | 12 6 7.59 |
| Tues. | 23 | 12 2 15.88 | 8.994 | S. 0 14 43.7 | 58.55 | 7 48.26 | 0.862 | 12 10 4.14 |
| Wed. | 24 | 12 5 51.83 | 9.001 | 0 38 9.3 | 58.56 | 8 8.86 | 0.856 | 12 14 0.69 |
| Thur. | 25 | 12 9 27.96 | 9.008 | 1 1 35.2 | 58.57 | 8 29.29 | 0.849 | 12 17 57.25 |
| Fri. | 26 | 12 13 4.27 | 9.016 | 1 25 1.0 | 58.56 | 8 49.53 | 0.841 | 12 21 53.80 |
| Sat. | 27 | 12 16 40.77 | 9.026 | 1 48 26.4 | 58.55 | 9 9.58 | 0.830 | 12 25 50.35 |
| *Sun.* | 28 | 12 20 17.52 | 9.035 | 2 11 51.1 | 58.50 | 9 29.39 | 0.821 | 12 29 46.91 |
| Mon. | 29 | 12 23 54.49 | 9.046 | 2 35 14.8 | 58.45 | 9 48.97 | 0.811 | 12 33 43.46 |
| Tues. | 30 | 12 27 31.73 | 9.057 | 2 58 37.0 | 58.37 | 10 8.28 | 0.800 | 12 37 40.01 |
| Wed. | 31 | 12 31 9.25 | 9.069 | S. 3 21 57.2 | 58.29 | 10 27.32 | 0.788 | 12 41 36.57 |

**Note. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.**

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 245 | 159 11 8.9 | 10 39.5 | 145.39 | +0.23 | 0.0036972 | 44.7 | 13 14 29.53 |
| 2 | 246 | 160 9 19.3 | 8 49.8 | 145.46 | +0.10 | .0035890 | 45.4 | 13 10 33.62 |
| 3 | 247 | 161 7 31.1 | 7 1.5 | 145.52 | —0.04 | .0034794 | 45.9 | 13 6 37.72 |
| 4 | 248 | 162 5 44.4 | 5 14.6 | 145.58 | 0.17 | .0033683 | 46.5 | 13 2 41.80 |
| 5 | 249 | 163 3 59.3 | 3 29.4 | 145.64 | 0.27 | .0032557 | 47.0 | 12 58 45.89 |
| 6 | 250 | 164 2 15.9 | 1 45.9 | 145.70 | 0.39 | .0031419 | 47.6 | 12 54 50.00 |
| 7 | 251 | 165 0 33.9 | 0 3.8 | 145.77 | 0.45 | .0030270 | 48.1 | 12 50 54.08 |
| 8 | 252 | 165 58 53.3 | 58 23.1 | 145.84 | 0.49 | .0029112 | 48.3 | 12 46 58.17 |
| 9 | 253 | 166 57 14.2 | 56 43.9 | 145.90 | 0.51 | .0027947 | 48.5 | 12 43 2.26 |
| 10 | 254 | 167 55 36.7 | 55 6.3 | 145.96 | 0.49 | .0026776 | 48.7 | 12 39 6.36 |
| 11 | 255 | 168 54 0.8 | 53 30.2 | 146.03 | 0.44 | .0025601 | 48.9 | 12 35 10.45 |
| 12 | 256 | 169 52 26.7 | 51 56.0 | 146.10 | 0.37 | .0024423 | 49.2 | 12 31 14.54 |
| 13 | 257 | 170 50 54.3 | 50 23.5 | 146.18 | 0.27 | .0023242 | 49.2 | 12 27 18.63 |
| 14 | 258 | 171 49 23.7 | 48 52.8 | 146.26 | 0.16 | .0022059 | 49.2 | 12 23 22.72 |
| 15 | 259 | 172 47 55.1 | 47 24.1 | 146.34 | —0.02 | .0020875 | 49.3 | 12 19 26.82 |
| 16 | 260 | 173 46 28.5 | 45 57.3 | 146.43 | +0.11 | .0019691 | 49.4 | 12 15 30.92 |
| 17 | 261 | 174 45 3.9 | 44 32.6 | 146.52 | 0.24 | .0018505 | 49.4 | 12 11 35.00 |
| 18 | 262 | 175 43 41.3 | 43 9.9 | 146.61 | 0.34 | .0017318 | 49.5 | 12 7 39.09 |
| 19 | 263 | 176 42 20.9 | 41 49.4 | 146.70 | 0.49 | .0016129 | 49.6 | 12 3 43.19 |
| 20 | 264 | 177 41 2.8 | 40 31.2 | 146.79 | 0.58 | .0014938 | 49.7 | 11 59 47.28 |
| 21 | 265 | 178 39 46.9 | 39 15.2 | 146.88 | 0.65 | .0013745 | 49.8 | 11 55 51.37 |
| 22 | 266 | 179 38 33.3 | 38 1.5 | 146.98 | 0.68 | .0012548 | 50.0 | 11 51 55.46 |
| 23 | 267 | 180 37 22.0 | 36 50.1 | 147.98 | 0.70 | .0011346 | 50.2 | 11 47 59.56 |
| 24 | 268 | 181 36 13.0 | 35 41.0 | 147.07 | 0.68 | .0010138 | 50.4 | 11 44 3.65 |
| 25 | 269 | 182 35 6.2 | 34 34.0 | 147.26 | 0.62 | .0008923 | 50.7 | 11 40 7.74 |
| 26 | 270 | 183 34 1.6 | 33 29.3 | 147.36 | 0.54 | .0007701 | 51.0 | 11 36 11.83 |
| 27 | 271 | 184 32 59.2 | 32 26.8 | 147.46 | 0.45 | .0006471 | 51.4 | 11 32 15.93 |
| 28 | 272 | 185 31 59.1 | 31 26.6 | 147.55 | 0.32 | .0005233 | 51.7 | 11 28 20.02 |
| 29 | 273 | 186 31 0.9 | 30 28.3 | 147.63 | 0.19 | .0003986 | 52.1 | 11 24 24.11 |
| 30 | 274 | 187 30 4.7 | 29 32.0 | 147.72 | +0.06 | .0002732 | 52.4 | 11 20 28.21 |
| 31 | 275 | 188 29 10.5 | 28 37.7 | 147.80 | —0.06 | 0.0001471 | 52.7 | 11 16 32.29 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | . | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 14 45.6 | 14 44.8 | 54 3.6 | −0.32 | 54 0.6 | −0.19 | 1 26.4 | 1.60 | 2.0 |
| 2 | 14 44.4 | 14 44.5 | 53 59.1 | −0.05 | 53 59.5 | +0.11 | 2 5.2 | 1.61 | 3.0 |
| 3 | 14 45.1 | 14 46.3 | 54 1.8 | +0.27 | 54 6.1 | 0.44 | 2 44.8 | 1.67 | 4.0 |
| 4 | 14 48.1 | 14 50.5 | 54 12.5 | 0.62 | 54 21.1 | 0.81 | 3 26.2 | 1.76 | 5.0 |
| 5 | 14 53.5 | 14 57.1 | 54 32.0 | 1.00 | 54 45.3 | 1.19 | 4 10.3 | 1.90 | 6.0 |
| 6 | 15 1.3 | 15 6.1 | 55 0.9 | 1.39 | 55 18.8 | 1.59 | 4 58.0 | 2.07 | 7.0 |
| 7 | 15 11.6 | 15 17.7 | 55 39.0 | 1.78 | 56 1.4 | 1.96 | 5 49.7 | 2.26 | 8.0 |
| 8 | 15 24.3 | 15 31.4 | 56 25.8 | 2.12 | 56 51.9 | 2.25 | 6 45.2 | 2.40 | 9.0 |
| 9 | 15 38.9 | 15 46.7 | 57 19.3 | 2.34 | 57 47.7 | 2.40 | 7 43.2 | 2.47 | 10.0 |
| 10 | 15 54.6 | 16 2.5 | 58 16.7 | 2.43 | 58 45.8 | 2.41 | 8 41.9 | 2.44 | 11.0 |
| 11 | 16 10.2 | 16 17.5 | 59 14.3 | 2.32 | 59 41.2 | 2.16 | 9 39.4 | 2.35 | 12.0 |
| 12 | 16 24.3 | 16 30.3 | 60 5.8 | 1.96 | 60 27.8 | 1.71 | 10 34.8 | 2.25 | 13.0 |
| 13 | 16 35.4 | 16 39.4 | 60 46.6 | 1.40 | 61 1.4 | 1.05 | 11 28.0 | 2.16 | 14.0 |
| 14 | 16 42.2 | 16 43.8 | 61 11.8 | +0.69 | 61 17.5 | +0.27 | 12 19.7 | 2.11 | 15.0 |
| 15 | 16 44.0 | 16 42.9 | 61 18.3 | −0.14 | 61 14.4 | −0.54 | 13 10.9 | 2.14 | 16.0 |
| 16 | 16 40.6 | 16 37.1 | 61 5.9 | 0.92 | 60 53.0 | 1.26 | 14 3.3 | 2.21 | 17.0 |
| 17 | 16 32.6 | 16 27.2 | 60 36.2 | 1.55 | 60 16.3 | 1.79 | 14 57.5 | 2.31 | 18.0 |
| 18 | 16 21.1 | 16 14.5 | 59 54.0 | 1.97 | 59 29.9 | 2.09 | 15 54.0 | 2.42 | 19.0 |
| 19 | 16 7.5 | 16 0.3 | 59 4.5 | 2.16 | 58 38.2 | 2.19 | 16 52.5 | 2.49 | 20.0 |
| 20 | 15 53.1 | 15 46.0 | 58 11.6 | 2.18 | 57 45.8 | 2.13 | 17 51.7 | 2.48 | 21.0 |
| 21 | 15 39.2 | 15 32.7 | 57 20.7 | 2.05 | 56 56.6 | 1.95 | 18 49.7 | 2.36 | 22.0 |
| 22 | 15 26.6 | 15 20.9 | 56 33.8 | 1.83 | 56 12.5 | 1.70 | 19 44.5 | 2.21 | 23.0 |
| 23 | 15 15.5 | 15 10.5 | 55 52.9 | 1.57 | 55 35.0 | 1.44 | 20 35.5 | 2.02 | 24.0 |
| 24 | 15 6.0 | 15 2.0 | 55 18.6 | 1.31 | 55 3.7 | 1.18 | 21 22.4 | 1.86 | 25.0 |
| 25 | 14 58.4 | 14 55.2 | 54 50.4 | 1.04 | 54 38.7 | 0.91 | 22 5.8 | 1.73 | 26.0 |
| 26 | 14 52.4 | 14 50.0 | 54 28.5 | 0.79 | 54 19.7 | 0.67 | 22 46.6 | 1.65 | 27.0 |
| 27 | 14 48.0 | 14 46.4 | 54 12.3 | 0.56 | 54 6.2 | 0.45 | 23 25.9 | 1.61 | 28.0 |
| 28 | 14 45.1 | 14 44.1 | 54 1.4 | 0.34 | 53 57.9 | −0.23 | ☌ | | 29.0 |
| 29 | 14 43.5 | 14 43.3 | 53 55.8 | −0.11 | 53 55.1 | +0.01 | 0 4.7 | 1.60 | 0.3 |
| 30 | 14 43.5 | 14 44.1 | 53 55.9 | +0.13 | 53 58.1 | 0.24 | 0 43.9 | 1.63 | 1.3 |
| 31 | 14 45.1 | 14 46.5 | 54 1.7 | +0.36 | 54 6.9 | +0.49 | 1 24.5 | 1.73 | 2.3 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 1. | | | | | WEDNESDAY 3. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 7 27.25 | 1.7392 | N. 0 35 28.6 | 14.159 | 0 | 13 31 31.46 | 1.7897 | S.10 29 12.9 | 13.257 |
| 1 | 12 9 11.59 | 1.7388 | 0 21 19.1 | 14.158 | 1 | 13 33 18.93 | 1.7925 | 10 42 27.2 | 13.221 |
| 2 | 12 10 55.91 | 1.7384 | N. 0 7 9.7 | 14.156 | 2 | 13 35 6.56 | 1.7953 | 10 55 39.3 | 13.183 |
| 3 | 12 12 40.21 | 1.7380 | S. 0 6 59.6 | 14.153 | 3 | 13 36 54.36 | 1.7981 | 11 8 49.1 | 13.144 |
| 4 | 12 14 24.48 | 1.7377 | 0 21 8.6 | 14.148 | 4 | 13 38 42.33 | 1.8009 | 11 21 56.5 | 13.105 |
| 5 | 12 16 8.73 | 1.7374 | 0 35 17.3 | 14.143 | 5 | 13 40 30.47 | 1.8039 | 11 35 1.6 | 13.066 |
| 6 | 12 17 52.97 | 1.7372 | 0 49 25.8 | 14.137 | 6 | 13 42 18.79 | 1.8070 | 11 48 4.4 | 13.026 |
| 7 | 12 19 37.19 | 1.7371 | 1 3 33.9 | 14.131 | 7 | 13 44 7.30 | 1.8101 | 12 1 4.7 | 12.985 |
| 8 | 12 21 21.41 | 1.7370 | 1 17 41.6 | 14.124 | 8 | 13 45 56.00 | 1.8132 | 12 14 2.5 | 12.941 |
| 9 | 12 23 5.63 | 1.7370 | 1 31 48.8 | 14.116 | 9 | 13 47 44.89 | 1.8165 | 12 26 57.7 | 12.900 |
| 10 | 12 24 49.85 | 1.7371 | 1 45 55.5 | 14.107 | 10 | 13 49 33.98 | 1.8198 | 12 39 50.4 | 12.856 |
| 11 | 12 26 34.08 | 1.7372 | 2 0 1.7 | 14.098 | 11 | 13 51 23.27 | 1.8231 | 12 52 40.5 | 12.813 |
| 12 | 12 28 18 31 | 1.7373 | 2 14 7.5 | 14.090 | 12 | 13 53 12.76 | 1.8265 | 13 5 27.9 | 12.767 |
| 13 | 12 30 2.55 | 1.7375 | 2 28 12.6 | 14.081 | 13 | 13 55 2.45 | 1.8300 | 13 18 12.5 | 12.721 |
| 14 | 12 31 46.81 | 1.7378 | 2 42 17.0 | 14.070 | 14 | 13 56 52.36 | 1.8336 | 13 30 54.3 | 12.673 |
| 15 | 12 33 31.09 | 1.7383 | 2 56 20.8 | 14.058 | 15 | 13 58 42.49 | 1.8373 | 13 43 33.2 | 12.626 |
| 16 | 12 35 15.41 | 1.7388 | 3 10 23.8 | 14.045 | 16 | 14 0 32.84 | 1.8410 | 13 56 9.3 | 12.578 |
| 17 | 12 36 59.75 | 1.7393 | 3 24 26.1 | 14.032 | 17 | 14 2 23.41 | 1.8447 | 14 8 42.5 | 12.529 |
| 18 | 12 38 44.12 | 1.7399 | 3 38 27.6 | 14.018 | 18 | 14 4 14.21 | 1.8486 | 14 21 12.7 | 12.478 |
| 19 | 12 40 28.53 | 1.7406 | 3 52 28.2 | 14.003 | 19 | 14 6 5.25 | 1.8525 | 14 33 39.8 | 12.426 |
| 20 | 12 42 12.98 | 1.7414 | 4 6 27.9 | 13.987 | 20 | 14 7 56.52 | 1.8564 | 14 46 3.8 | 12.375 |
| 21 | 12 43 57.48 | 1.7423 | 4 20 26.6 | 13.970 | 21 | 14 9 48.03 | 1.8603 | 14 58 24.7 | 12.322 |
| 22 | 12 45 42.04 | 1.7431 | 4 34 24.3 | 13.952 | 22 | 14 11 39.78 | 1.8643 | 15 10 42.4 | 12.268 |
| 23 | 12 47 26.65 | 1.7439 | S. 4 48 20.9 | 13.934 | 23 | 14 13 31.77 | 1.8685 | S.15 22 56.8 | 12.213 |
| | TUESDAY 2. | | | | | THURSDAY 4. | | | |
| 0 | 12 49 11.31 | 1.7447 | S. 5 2 16.4 | 13.916 | 0 | 14 15 24.01 | 1.8728 | S.15 35 7.9 | 12.157 |
| 1 | 12 50 56.03 | 1.7458 | 5 16 10.8 | 13.897 | 1 | 14 17 16.51 | 1.8772 | 15 47 15.6 | 12.100 |
| 2 | 12 52 40.82 | 1.7470 | 5 30 4.1 | 13.876 | 2 | 14 19 9.28 | 1.8816 | 15 59 19.9 | 12.043 |
| 3 | 12 54 25.69 | 1.7482 | 5 43 56.2 | 13.855 | 3 | 14 21 2.31 | 1.8860 | 16 11 20.8 | 11.986 |
| 4 | 12 56 10.63 | 1.7495 | 5 57 47.0 | 13.835 | 4 | 14 22 55.61 | 1.8904 | 16 23 18.2 | 11.928 |
| 5 | 12 57 55.65 | 1.7508 | 6 11 36.5 | 13.814 | 5 | 14 24 49.16 | 1.8949 | 16 35 12.0 | 11.867 |
| 6 | 12 59 40.75 | 1.7523 | 6 25 24.7 | 13.792 | 6 | 14 26 42.98 | 1.8994 | 16 47 2.1 | 11.806 |
| 7 | 13 1 25.94 | 1.7538 | 6 39 11.5 | 13.770 | 7 | 14 28 37.07 | 1.9040 | 16 58 48.6 | 11.745 |
| 8 | 13 3 11.22 | 1.7554 | 6 52 56.9 | 13.746 | 8 | 14 30 31.45 | 1.9087 | 17 10 31.4 | 11.683 |
| 9 | 13 4 56.60 | 1.7571 | 7 6 40 9 | 13.720 | 9 | 14 32 26.12 | 1.9135 | 17 22 10.4 | 11.618 |
| 10 | 13 6 42.07 | 1.7588 | 7 20 23.3 | 13.693 | 10 | 14 34 21.07 | 1.9182 | 17 33 45.6 | 11.554 |
| 11 | 13 8 27.65 | 1.7606 | 7 34 4.1 | 13.667 | 11 | 14 36 16.31 | 1.9230 | 17 45 16.9 | 11.492 |
| 12 | 13 10 13.34 | 1.7624 | 7 47 43.3 | 13.641 | 12 | 14 38 11.85 | 1.9279 | 17 56 44.4 | 11.426 |
| 13 | 13 11 59.14 | 1.7643 | 8 1 20.9 | 13.613 | 13 | 14 40 7.69 | 1.9330 | 18 8 7.9 | 11.358 |
| 14 | 13 13 45.06 | 1.7662 | 8 14 56.8 | 13.584 | 14 | 14 42 3.82 | 1.9381 | 18 19 27.3 | 11.290 |
| 15 | 13 15 31.09 | 1.7682 | 8 28 31.0 | 13.554 | 15 | 14 44 0.26 | 1.9432 | 18 30 42.6 | 11.220 |
| 16 | 13 17 17.24 | 1.7702 | 8 42 3.3 | 13.524 | 16 | 14 45 57.00 | 1.9482 | 18 41 53.7 | 11.150 |
| 17 | 13 19 3.52 | 1.7725 | 8 55 33.8 | 13.493 | 17 | 14 47 54.05 | 1.9533 | 18 53 0.6 | 11.080 |
| 18 | 13 20 49.94 | 1.7748 | 9 9 2.5 | 13.461 | 18 | 14 49 51.41 | 1.9586 | 19 4 3.3 | 11.010 |
| 19 | 13 22 36.50 | 1.7772 | 9 22 29.2 | 13.429 | 19 | 14 51 49.09 | 1.9639 | 19 15 1.7 | 10.938 |
| 20 | 13 24 23.20 | 1.7796 | 9 35 54.0 | 13.397 | 20 | 14 53 47.09 | 1.9693 | 19 25 55.7 | 10.863 |
| 21 | 13 26 10.04 | 1.7819 | 9 49 16.9 | 13.364 | 21 | 14 55 45.41 | 1.9747 | 19 36 45.2 | 10.788 |
| 22 | 13 27 57.02 | 1.7844 | 10 2 37.7 | 13.330 | 22 | 14 57 44.05 | 1.9801 | 19 47 30.2 | 10.712 |
| 23 | 13 29 44.16 | 1.7870 | 10 15 56.4 | 13.293 | 23 | 14 59 43.02 | 1.9857 | 19 58 10.6 | 10.635 |
| 24 | 13 31 31.46 | 1.7897 | S.10 29 12.9 | 13.257 | 24 | 15 1 42.33 | 1.9914 | S.20 8 46.4 | 10.559 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 15 1 42.33 | 1.9914 | S.20 8 46.4 | 10.559 |
| 1 | 15 3 41.96 | 1.9967 | 20 19 17.6 | 10.480 |
| 2 | 15 5 41.93 | 2.0022 | 20 29 44.0 | 10.401 |
| 3 | 15 7 42.23 | 2.0078 | 20 40 5.6 | 10.320 |
| 4 | 15 9 42.88 | 2.0135 | 20 50 22.3 | 10.236 |
| 5 | 15 11 43.88 | 2.0193 | 21 0 34.0 | 10.156 |
| 6 | 15 13 45.22 | 2.0251 | 21 10 40.8 | 10.071 |
| 7 | 15 15 46.91 | 2.0310 | 21 20 42.5 | 9.987 |
| 8 | 15 17 48.95 | 2.0370 | 21 30 39.1 | 9.901 |
| 9 | 15 19 51.35 | 2.0430 | 21 40 30.5 | 9.812 |
| 10 | 15 21 54.12 | 2.0490 | 21 50 16.6 | 9.726 |
| 11 | 15 23 57.25 | 2.0550 | 21 59 57.5 | 9.638 |
| 12 | 15 26 0.73 | 2.0610 | 22 9 33.1 | 9.548 |
| 13 | 15 28 4.57 | 2.0670 | 22 19 3.2 | 9.457 |
| 14 | 15 30 8.77 | 2.0730 | 22 28 27.8 | 9.364 |
| 15 | 15 32 13.33 | 2.0790 | 22 37 46.8 | 9.269 |
| 16 | 15 34 18.26 | 2.0851 | 22 47 0.1 | 9.175 |
| 17 | 15 36 23.56 | 2.0912 | 22 56 7.7 | 9.082 |
| 18 | 15 38 29.22 | 2.0974 | 23 5 9.7 | 8.984 |
| 19 | 15 40 35.25 | 2.1036 | 23 14 5.8 | 8.887 |
| 20 | 15 42 41.66 | 2.1098 | 23 22 56.0 | 8.786 |
| 21 | 15 44 48.44 | 2.1162 | 23 31 40.1 | 8.685 |
| 22 | 15 46 55.60 | 2.1225 | 23 40 18.2 | 8.585 |
| 23 | 15 49 3.14 | 2.1288 | S.23 48 50.3 | 8.484 |

### SATURDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 51 11.06 | 2.1352 | S.23 57 16.2 | 8.379 |
| 1 | 15 53 19.36 | 2.1415 | 24 5 35.8 | 8.274 |
| 2 | 15 55 28.04 | 2.1478 | 24 13 49.1 | 8.168 |
| 3 | 15 57 37.10 | 2.1542 | 24 21 56.1 | 8.062 |
| 4 | 15 59 46.54 | 2.1606 | 24 29 56.7 | 7.955 |
| 5 | 16 1 56.37 | 2.1670 | 24 37 50.7 | 7.845 |
| 6 | 16 4 6.57 | 2.1733 | 24 45 38.1 | 7.734 |
| 7 | 16 6 17.16 | 2.1798 | 24 53 18.8 | 7.623 |
| 8 | 16 8 28.14 | 2.1862 | 25 0 52.8 | 7.511 |
| 9 | 16 10 39.50 | 2.1926 | 25 8 20.0 | 7.398 |
| 10 | 16 12 51.25 | 2.1991 | 25 15 40.4 | 7.284 |
| 11 | 16 15 3.39 | 2.2056 | 25 22 53.8 | 7.167 |
| 12 | 16 17 15.93 | 2.2122 | 25 30 0.3 | 7.050 |
| 13 | 16 19 28.85 | 2.2186 | 25 36 59.7 | 6.932 |
| 14 | 16 21 42.15 | 2.2248 | 25 43 51.9 | 6.812 |
| 15 | 16 23 55.82 | 2.2310 | 25 50 37.0 | 6.691 |
| 16 | 16 26 9.87 | 2.2373 | 25 57 14.8 | 6.567 |
| 17 | 16 28 24.30 | 2.2437 | 26 3 45.2 | 6.443 |
| 18 | 16 30 39.11 | 2.2501 | 26 10 8.1 | 6.322 |
| 19 | 16 32 54.30 | 2.2565 | 26 16 23.6 | 6.196 |
| 20 | 16 35 9.87 | 2.2627 | 26 22 31.5 | 6.069 |
| 21 | 16 37 25.81 | 2.2689 | 26 28 31.7 | 5.941 |
| 22 | 16 39 42.12 | 2.2750 | 26 34 24.3 | 5.812 |
| 23 | 16 41 58.80 | 2.2810 | 26 40 9.1 | 5.683 |
| 24 | 16 44 15.84 | 2.2872 | S.26 45 46.1 | 5.549 |

### SUNDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 44 15.84 | 2.2872 | S.26 45 46.1 | 5.549 |
| 1 | 16 46 33.25 | 2.2932 | 26 51 15.1 | 5.417 |
| 2 | 16 48 51.02 | 2.2993 | 26 56 36.2 | 5.284 |
| 3 | 16 51 9.16 | 2.3054 | 27 1 49.4 | 5.152 |
| 4 | 16 53 27.67 | 2.3114 | 27 6 54.4 | 5.016 |
| 5 | 16 55 46.53 | 2.3173 | 27 11 51.2 | 4.878 |
| 6 | 16 58 5.74 | 2.3232 | 27 16 39.7 | 4.740 |
| 7 | 17 0 25.30 | 2.3290 | 27 21 19.9 | 4.601 |
| 8 | 17 2 45.21 | 2.3348 | 27 25 51.7 | 4.459 |
| 9 | 17 5 5.47 | 2.3405 | 27 30 15.0 | 4.318 |
| 10 | 17 7 26.07 | 2.3462 | 27 34 29.8 | 4.176 |
| 11 | 17 9 47.01 | 2.3518 | 27 38 36.0 | 4.030 |
| 12 | 17 12 8.29 | 2.3575 | 27 42 33.5 | 3.888 |
| 13 | 17 14 29.91 | 2.3630 | 27 46 22.4 | 3.743 |
| 14 | 17 16 51.85 | 2.3684 | 27 50 2.5 | 3.594 |
| 15 | 17 19 14.10 | 2.3735 | 27 53 33.7 | 3.447 |
| 16 | 17 21 36.67 | 2.3788 | 27 56 56.0 | 3.296 |
| 17 | 17 23 59.56 | 2.3842 | 28 0 9.3 | 3.149 |
| 18 | 17 26 22.77 | 2.3895 | 28 3 13.7 | 2.996 |
| 19 | 17 28 46.29 | 2.3945 | 28 6 9.0 | 2.846 |
| 20 | 17 31 10.11 | 2.3994 | 28 8 55.1 | 2.691 |
| 21 | 17 33 34.21 | 2.4043 | 28 11 31.9 | 2.537 |
| 22 | 17 35 58.61 | 2.4092 | 28 13 59.5 | 2.383 |
| 23 | 17 38 23.31 | 2.4141 | S.28 16 17.8 | 2.226 |

### MONDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 40 48.30 | 2.4189 | S.28 18 26.7 | 2.071 |
| 1 | 17 43 13.57 | 2.4235 | 28 20 26.2 | 1.913 |
| 2 | 17 45 39.11 | 2.4278 | 28 22 16.2 | 1.753 |
| 3 | 17 48 4.91 | 2.4321 | 28 23 56.6 | 1.596 |
| 4 | 17 50 30.97 | 2.4363 | 28 25 27.5 | 1.434 |
| 5 | 17 52 57.27 | 2.4405 | 28 26 48.7 | 1.273 |
| 6 | 17 55 23.82 | 2.4445 | 28 28 0.2 | 1.113 |
| 7 | 17 57 50.61 | 2.4485 | 28 29 2.0 | 0.947 |
| 8 | 18 0 17.64 | 2.4525 | 28 29 53.9 | 0.786 |
| 9 | 18 2 44.91 | 2.4565 | 28 30 36.0 | 0.622 |
| 10 | 18 5 12.42 | 2.4602 | 28 31 8.3 | 0.455 |
| 11 | 18 7 40.13 | 2.4636 | 28 31 30.6 | 0.289 |
| 12 | 18 10 8.04 | 2.4670 | 28 31 42.9 | 0.120 |
| 13 | 18 12 36.16 | 2.4704 | 28 31 45.1 | 0.046 |
| 14 | 18 15 4.48 | 2.4738 | 28 31 37.3 | 0.213 |
| 15 | 18 17 33.00 | 2.4770 | 28 31 19.4 | 0.383 |
| 16 | 18 20 1.71 | 2.4800 | 28 30 51.3 | 0.554 |
| 17 | 18 22 30.58 | 2.4827 | 28 30 13.0 | 0.721 |
| 18 | 18 24 59.61 | 2.4853 | 28 29 24.6 | 0.892 |
| 19 | 18 27 28.81 | 2.4878 | 28 28 25.9 | 1.064 |
| 20 | 18 29 58.17 | 2.4905 | 28 27 16.9 | 1.236 |
| 21 | 18 32 27.69 | 2.4930 | 28 25 57.6 | 1.407 |
| 22 | 18 34 57.36 | 2.4955 | 28 24 28.0 | 1.580 |
| 23 | 18 37 27.15 | 2.4977 | 28 22 48.0 | 1.753 |
| 24 | 18 39 57.07 | 2.4997 | S.28 20 57.6 | 1.926 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 39 57.07 | 2.4997 | S.28 20 57.6 | 1.926 |
| 1 | 18 42 27.11 | 2.5017 | 28 18 56.8 | 2.100 |
| 2 | 18 44 57.26 | 2.5033 | 28 16 45.5 | 2.274 |
| 3 | 18 47 27.51 | 2.5049 | 28 14 23.8 | 2.449 |
| 4 | 18 49 57.85 | 2.5065 | 28 11 51.6 | 2.628 |
| 5 | 18 52 28.28 | 2.5081 | 28 9 8.9 | 2.801 |
| 6 | 18 54 58.81 | 2.5095 | 28 6 15.6 | 2.975 |
| 7 | 18 57 29.42 | 2.5107 | 28 3 11.8 | 3.153 |
| 8 | 19 0 0.10 | 2.5117 | 27 59 57.4 | 3.327 |
| 9 | 19 2 30.82 | 2.5127 | 27 56 32.5 | 3.508 |
| 10 | 19 5 1.57 | 2.5137 | 27 52 57.0 | 3.680 |
| 11 | 19 7 32.41 | 2.5143 | 27 49 10.9 | 3.857 |
| 12 | 19 10 3.29 | 2.5150 | 27 45 14.2 | 4.033 |
| 13 | 19 12 34.21 | 2.5153 | 27 41 6.9 | 4.211 |
| 14 | 19 15 5.14 | 2.5157 | 27 36 49.0 | 4.385 |
| 15 | 19 17 36.08 | 2.5158 | 27 32 20.6 | 4.562 |
| 16 | 19 20 7.03 | 2.5158 | 27 27 41.6 | 4.738 |
| 17 | 19 22 37.98 | 2.5158 | 27 22 52.0 | 4.915 |
| 18 | 19 25 8.93 | 2.5158 | 27 17 51.8 | 5.092 |
| 19 | 19 27 39.87 | 2.5155 | 27 12 41.0 | 5.268 |
| 20 | 19 30 10.79 | 2.5150 | 27 7 19.7 | 5.442 |
| 21 | 19 32 41.68 | 2.5147 | 27 1 47.9 | 5.619 |
| 22 | 19 35 12.54 | 2.5140 | 26 56 5.5 | 5.793 |
| 23 | 19 37 43.36 | 2.5134 | S.26 50 12.6 | 5.971 |

### WEDNESDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 40 14.14 | 2.5127 | S.26 44 9.1 | 6.147 |
| 1 | 19 42 44.87 | 2.5118 | 26 37 55.1 | 6.319 |
| 2 | 19 45 15.54 | 2.5106 | 26 31 30.7 | 6.494 |
| 3 | 19 47 46.14 | 2.5096 | 26 24 55.8 | 6.670 |
| 4 | 19 50 16.67 | 2.5083 | 26 18 10.4 | 6.844 |
| 5 | 19 52 47.12 | 2.5067 | 26 11 14.6 | 7.016 |
| 6 | 19 55 17.48 | 2.5052 | 26 4 8.5 | 7.188 |
| 7 | 19 57 47.75 | 2.5038 | 25 56 52.0 | 7.362 |
| 8 | 20 0 17.93 | 2.5022 | 25 49 25.1 | 7.537 |
| 9 | 20 2 48.01 | 2.5005 | 25 41 47.8 | 7.707 |
| 10 | 20 5 17.98 | 2.4985 | 25 34 0.3 | 7.878 |
| 11 | 20 7 47.83 | 2.4965 | 25 26 2.6 | 8.049 |
| 12 | 20 10 17.56 | 2.4946 | 25 17 54.6 | 8.219 |
| 13 | 20 12 47.17 | 2.4924 | 25 9 36.5 | 8.387 |
| 14 | 20 15 16.65 | 2.4903 | 25 1 8.3 | 8.554 |
| 15 | 20 17 46.00 | 2.4881 | 24 52 30.1 | 8.722 |
| 16 | 20 20 15.21 | 2.4856 | 24 43 41.8 | 8.888 |
| 17 | 20 22 46.27 | 2.4831 | 24 34 43.6 | 9.052 |
| 18 | 20 25 13.18 | 2.4807 | 24 25 35.5 | 9.218 |
| 19 | 20 27 41.94 | 2.4781 | 24 16 17.5 | 9.383 |
| 20 | 20 30 10.54 | 2.4752 | 24 6 49.7 | 9.544 |
| 21 | 20 32 38.97 | 2.4726 | 23 57 12.2 | 9.706 |
| 22 | 20 35 7.24 | 2.4697 | 23 47 25.0 | 9.866 |
| 23 | 20 37 35.34 | 2.4670 | 23 37 28.1 | 10.030 |
| 24 | 20 40 3.27 | 2.4640 | S.23 27 21.5 | 10.191 |

### THURSDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 40 3.27 | 2.4640 | S.23 27 21.5 | 10.191 |
| 1 | 20 42 31.02 | 2.4610 | 23 17 5.3 | 10.350 |
| 2 | 20 44 58.59 | 2.4581 | 23 6 39.6 | 10.507 |
| 3 | 20 47 25.98 | 2.4550 | 22 56 4.5 | 10.664 |
| 4 | 20 49 53.18 | 2.4516 | 22 45 20.0 | 10.819 |
| 5 | 20 52 20.18 | 2.4485 | 22 34 26.2 | 10.975 |
| 6 | 20 54 46.99 | 2.4452 | 22 23 23.1 | 11.130 |
| 7 | 20 57 13.60 | 2.4418 | 22 12 10.8 | 11.282 |
| 8 | 20 59 40.01 | 2.4385 | 22 0 49.5 | 11.432 |
| 9 | 21 2 6.22 | 2.4352 | 21 49 19.1 | 11.580 |
| 10 | 21 4 32.23 | 2.4317 | 21 37 39.7 | 11.731 |
| 11 | 21 6 58.03 | 2.4284 | 21 25 51.5 | 11.875 |
| 12 | 21 9 23.63 | 2.4250 | 21 13 54.6 | 12.023 |
| 13 | 21 11 49.02 | 2.4213 | 21 1 48.9 | 12.167 |
| 14 | 21 14 14.19 | 2.4176 | 20 49 34.6 | 12.312 |
| 15 | 21 16 39.14 | 2.4141 | 20 37 11.7 | 12.452 |
| 16 | 21 19 3.88 | 2.4106 | 20 24 40.4 | 12.592 |
| 17 | 21 21 28.41 | 2.4072 | 20 12 0.7 | 12.732 |
| 18 | 21 23 52.73 | 2.4036 | 19 59 12.7 | 12.868 |
| 19 | 21 26 16.83 | 2.3998 | 19 46 16.5 | 13.005 |
| 20 | 21 28 40.71 | 2.3962 | 19 33 12.1 | 13.143 |
| 21 | 21 31 4.37 | 2.3924 | 19 19 59.5 | 13.277 |
| 22 | 21 33 27.81 | 2.3889 | 19 6 38.9 | 13.411 |
| 23 | 21 35 51.04 | 2.3855 | S.18 53 10.4 | 13.539 |

### FRIDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 21 38 14.06 | 2.3818 | S.18 39 34.2 | 13.668 |
| 1 | 21 40 36.86 | 2.3782 | 18 25 50.3 | 13.797 |
| 2 | 21 42 59.44 | 2.3746 | 18 11 58.7 | 13.923 |
| 3 | 21 45 21.81 | 2.3708 | 17 57 59.6 | 14.048 |
| 4 | 21 47 43.94 | 2.3668 | 17 43 53.1 | 14.169 |
| 5 | 21 50 5.83 | 2.3627 | 17 29 39.3 | 14.292 |
| 6 | 21 52 27.49 | 2.3593 | 17 15 18.2 | 14.411 |
| 7 | 21 54 48.95 | 2.3561 | 17 0 50.0 | 14.531 |
| 8 | 21 57 10.21 | 2.3526 | 16 46 14.7 | 14.647 |
| 9 | 21 59 31.26 | 2.3491 | 16 31 32.5 | 14.760 |
| 10 | 22 1 52.10 | 2.3456 | 16 16 43.5 | 14.875 |
| 11 | 22 4 12.73 | 2.3423 | 16 1 47.7 | 14.986 |
| 12 | 22 6 33.15 | 2.3382 | 15 46 45.3 | 15.095 |
| 13 | 22 8 53.34 | 2.3348 | 15 31 36.4 | 15.202 |
| 14 | 22 11 13.33 | 2.3316 | 15 16 21.1 | 15.311 |
| 15 | 22 13 33.12 | 2.3280 | 15 0 59.4 | 15.412 |
| 16 | 22 15 52.70 | 2.3247 | 14 45 31.6 | 15.515 |
| 17 | 22 18 12.08 | 2.3212 | 14 29 57.7 | 15.617 |
| 18 | 22 20 31.26 | 2.3182 | 14 14 17.8 | 15.718 |
| 19 | 22 22 50.25 | 2.3147 | 13 58 32.1 | 15.810 |
| 20 | 22 25 9.04 | 2.3118 | 13 42 40.6 | 15.909 |
| 21 | 22 27 27.65 | 2.3087 | 13 26 43.3 | 16.002 |
| 22 | 22 29 46.07 | 2.3053 | 13 10 40.5 | 16.092 |
| 23 | 22 32 4.29 | 2.3018 | 12 54 32.3 | 16.183 |
| 24 | 22 34 22.31 | 2.2989 | S.12 38 18.7 | 16.270 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SATURDAY 13. | | | | | MONDAY 15. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 34 22.31 | 2.2989 | S.12 38 18.7 | 16.270 | 0 | 0 22 21.89 | 2.2282 | N. 1 26 42.8 | 18.158 |
| 1 | 22 36 40.16 | 2.2960 | 12 21 59.9 | 16.358 | 1 | 0 24 35.59 | 2.2286 | 1 44 51.9 | 18.148 |
| 2 | 22 38 57.84 | 2.2931 | 12 5 35.9 | 16.443 | 2 | 0 26 49.32 | 2.2290 | 2 3 0.3 | 18.133 |
| 3 | 22 41 15.34 | 2.2903 | 11 49 6.9 | 16.526 | 3 | 0 29 3.08 | 2.2295 | 2 21 7.8 | 18.118 |
| 4 | 22 43 32.67 | 2.2875 | 11 32 33.0 | 16.606 | 4 | 0 31 16.87 | 2.2300 | 2 39 14.3 | 18.101 |
| 5 | 22 45 49.83 | 2.2846 | 11 15 54.4 | 16.684 | 5 | 0 33 30.70 | 2.2306 | 2 57 19.7 | 18.083 |
| 6 | 22 48 6.81 | 2.2819 | 10 59 11.1 | 16.760 | 6 | 0 35 44.56 | 2.2313 | 3 15 24.0 | 18.061 |
| 7 | 22 50 23.63 | 2.2792 | 10 42 23.3 | 16.833 | 7 | 0 37 58.47 | 2.2324 | 3 33 26.9 | 18.036 |
| 8 | 22 52 40.30 | 2.2766 | 10 25 31.1 | 16.908 | 8 | 0 40 12.45 | 2.2337 | 3 51 28.3 | 18.012 |
| 9 | 22 54 56.81 | 2.2739 | 10 8 34.5 | 16.980 | 9 | 0 42 26.50 | 2.2346 | 4 9 28.2 | 17.986 |
| 10 | 22 57 13.17 | 2.2713 | 9 51 33.7 | 17.048 | 10 | 0 44 40.61 | 2.2359 | 4 27 26.4 | 17.955 |
| 11 | 22 59 29.38 | 2.2688 | 9 34 28.9 | 17.114 | 11 | 0 46 54.79 | 2.2365 | 4 45 22.7 | 17.923 |
| 12 | 23 1 45.43 | 2.2664 | 9 17 20.2 | 17.179 | 12 | 0 49 9.02 | 2.2377 | 5 3 17.0 | 17.888 |
| 13 | 23 4 1.34 | 2.2641 | 9 0 7.6 | 17.242 | 13 | 0 51 23.34 | 2.2395 | 5 21 9.2 | 17.852 |
| 14 | 23 6 17.12 | 2.2619 | 8 42 51.3 | 17.302 | 14 | 0 53 37.75 | 2.2408 | 5 38 59.2 | 17.818 |
| 15 | 23 8 32.77 | 2.2597 | 8 25 31.4 | 17.362 | 15 | 0 55 52.24 | 2.2422 | 5 56 47.0 | 17.777 |
| 16 | 23 10 48.29 | 2.2575 | 8 8 8.0 | 17.418 | 16 | 0 58 6.82 | 2.2438 | 6 14 32.3 | 17.734 |
| 17 | 23 13 3.68 | 2.2553 | 7 50 41.3 | 17.472 | 17 | 1 0 21.50 | 2.2457 | 6 32 15.0 | 17.689 |
| 18 | 23 15 18.94 | 2.2533 | 7 33 11.4 | 17.525 | 18 | 1 2 36.29 | 2.2473 | 6 49 55.0 | 17.642 |
| 19 | 23 17 34.08 | 2.2514 | 7 15 38.4 | 17.576 | 19 | 1 4 51.18 | 2.2492 | 7 7 32.3 | 17.598 |
| 20 | 23 19 49.11 | 2.2496 | 6 58 2.4 | 17.625 | 20 | 1 7 6.18 | 2.2507 | 7 25 6.6 | 17.546 |
| 21 | 23 22 4.03 | 2.2478 | 6 40 23.5 | 17.673 | 21 | 1 9 21.28 | 2.2527 | 7 42 37.8 | 17.496 |
| 22 | 23 24 18.85 | 2.2462 | 6 22 41.8 | 17.718 | 22 | 1 11 36.50 | 2.2547 | 8 0 5.9 | 17.442 |
| 23 | 23 26 33.57 | 2.2446 | S. 6 4 57.5 | 17.762 | 23 | 1 13 51.84 | 2.2566 | N. 8 17 30.7 | 17.387 |
| | SUNDAY 14. | | | | | TUESDAY 16. | | | |
| 0 | 23 28 48.19 | 2.2429 | S. 5 47 10.6 | 17.803 | 0 | 1 16 7.30 | 2.2587 | N 8 34 52.1 | 17.327 |
| 1 | 23 31 2.72 | 2.2414 | 5 29 21.4 | 17.841 | 1 | 1 18 22.89 | 2.2609 | 8 52 9.9 | 17.268 |
| 2 | 23 33 17.16 | 2.2398 | 5 11 29.9 | 17.876 | 2 | 1 20 38.61 | 2.2629 | 9 9 24.1 | 17.206 |
| 3 | 23 35 31.51 | 2.2382 | 4 53 36.3 | 17.913 | 3 | 1 22 54.46 | 2.2653 | 9 26 34.5 | 17.142 |
| 4 | 23 37 45.78 | 2.2368 | 4 35 40.6 | 17.943 | 4 | 1 25 10.46 | 2.2678 | 9 43 41.0 | 17.076 |
| 5 | 23 39 59.99 | 2.2356 | 4 17 43.1 | 17.973 | 5 | 1 27 26.61 | 2.2706 | 10 0 43.5 | 17.009 |
| 6 | 23 42 14.13 | 2.2346 | 3 59 43.8 | 18.002 | 6 | 1 29 42.92 | 2.2730 | 10 17 41.9 | 16.938 |
| 7 | 23 44 28.20 | 2.2339 | 3 41 42.9 | 18.028 | 7 | 1 31 59.38 | 2.2757 | 10 34 36.0 | 16.868 |
| 8 | 23 46 42.21 | 2.2332 | 3 23 40.5 | 18.055 | 8 | 1 34 16.00 | 2.2782 | 10 51 25.8 | 16.793 |
| 9 | 23 48 56.17 | 2.2321 | 3 5 36.6 | 18.076 | 9 | 1 36 32.77 | 2.2807 | 11 8 11.1 | 16.717 |
| 10 | 23 51 10.07 | 2.2313 | 2 47 31.5 | 18.096 | 10 | 1 38 49.71 | 2.2837 | 11 24 51.8 | 16.642 |
| 11 | 23 53 23.92 | 2.2303 | 2 29 25.3 | 18.112 | 11 | 1 41 6.81 | 2.2867 | 11 41 27.8 | 16.562 |
| 12 | 23 55 37.72 | 2.2296 | 2 11 18.1 | 18.129 | 12 | 1 43 24.10 | 2.2895 | 11 57 59.2 | 16.482 |
| 13 | 23 57 51.48 | 2.2292 | 1 53 10.0 | 18.142 | 13 | 1 45 41.56 | 2.2924 | 12 14 25.6 | 16.399 |
| 14 | 0 0 5.22 | 2.2288 | 1 35 1.0 | 18.152 | 14 | 1 47 59.20 | 2.2957 | 12 30 47.0 | 16.316 |
| 15 | 0 2 18.94 | 2.2285 | 1 16 51.6 | 18.162 | 15 | 1 50 17.03 | 2.2987 | 12 47 3.3 | 16.228 |
| 16 | 0 4 32.64 | 2.2283 | 0 58 41.6 | 18.172 | 16 | 1 52 35.03 | 2.3018 | 13 3 14.3 | 16.141 |
| 17 | 0 6 46.32 | 2.2278 | 0 40 31.1 | 18.179 | 17 | 1 54 53.24 | 2.3047 | 13 19 20.0 | 16.050 |
| 18 | 0 8 59.97 | 2.2276 | 0 22 20.3 | 18.182 | 18 | 1 57 11.62 | 2.3077 | 13 35 20.2 | 15.958 |
| 19 | 0 11 13.61 | 2.2276 | S. 0 4 9.4 | 18.182 | 19 | 1 59 30.19 | 2.3109 | 13 51 14.8 | 15.863 |
| 20 | 0 13 27.25 | 2.2275 | N. 0 14 1.5 | 18.182 | 20 | 2 1 48.96 | 2.3147 | 14 7 3.7 | 15.768 |
| 21 | 0 15 40.90 | 2.2274 | 0 32 12.3 | 18.180 | 21 | 2 4 7.94 | 2.3179 | 14 22 46.8 | 15.668 |
| 22 | 0 17 54.55 | 2.2275 | 0 50 22.9 | 18.174 | 22 | 2 6 27.12 | 2.3215 | 14 38 23.9 | 15.569 |
| 23 | 0 20 8.21 | 2.2278 | 1 8 33.1 | 18.167 | 23 | 2 8 46.51 | 2.3248 | 14 53 55.1 | 15.471 |
| 24 | 0 22 21.89 | 2.2282 | N. 1 26 42.8 | 18.158 | 24 | 2 11 6.10 | 2.3280 | N.15 9 20.4 | 15.370 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | WEDNESDAY 17. | | | | | FRIDAY 19. | | | |
| | h. m. s. | s. | ° ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 11 6.10 | 2.3280 | N.15 9 20.4 | 15.370 | 0 | 4 7 6.39 | 2.4993 | N.24 58 57.2 | 8.685 |
| 1 | 2 13 25.89 | 2.3317 | 15 24 39.5 | 15.265 | 1 | 4 9 36.43 | 2.5021 | 25 7 33.2 | 8.514 |
| 2 | 2 15 45.90 | 2.3353 | 15 39 52.2 | 15.160 | 2 | 4 12 6.63 | 2.5047 | 25 15 59.0 | 8.346 |
| 3 | 2 18 6.13 | 2.3390 | 15 54 58.5 | 15.051 | 3 | 4 14 36.98 | 2.5070 | 25 24 14.7 | 8.179 |
| 4 | 2 20 26.58 | 2.3426 | 16 9 58.2 | 14.939 | 4 | 4 17 7.47 | 2.5093 | 25 32 20.3 | 8.008 |
| 5 | 2 22 47.25 | 2.3462 | 16 24 51.2 | 14.829 | 5 | 4 19 38.10 | 2.5116 | 25 40 15.6 | 7.835 |
| 6 | 2 25 8.13 | 2.3498 | 16 39 37.5 | 14.714 | 6 | 4 22 8.87 | 2.5146 | 25 48 0.6 | 7.667 |
| 7 | 2 27 29.23 | 2.3534 | 16 54 16.9 | 14.600 | 7 | 4 24 39.79 | 2.5163 | 25 55 35.4 | 7.492 |
| 8 | 2 29 50.55 | 2.3571 | 17 8 49.4 | 14.484 | 8 | 4 27 10.83 | 2.5184 | 26 2 59.8 | 7.322 |
| 9 | 2 32 12.09 | 2.3609 | 17 23 14.9 | 14.368 | 9 | 4 29 41.99 | 2.5203 | 26 10 13.9 | 7.149 |
| 10 | 2 34 33.87 | 2.3647 | 17 37 33.3 | 14.250 | 10 | 4 32 13.26 | 2.5221 | 26 17 17.6 | 6.974 |
| 11 | 2 36 55.87 | 2.3685 | 17 51 44.4 | 14.127 | 11 | 4 34 44.64 | 2.5241 | 26 24 10.8 | 6.798 |
| 12 | 2 39 18.09 | 2.3723 | 18 5 48.3 | 14.004 | 12 | 4 37 16.13 | 2.5256 | 26 30 53.5 | 6.623 |
| 13 | 2 41 40.54 | 2.3761 | 18 19 44.8 | 13.880 | 13 | 4 39 47.71 | 2.5271 | 26 37 25.6 | 6.448 |
| 14 | 2 44 3.22 | 2.3799 | 18 33 33.8 | 13.754 | 14 | 4 42 19.38 | 2.5287 | 26 43 47.2 | 6.272 |
| 15 | 2 46 26.13 | 2.3837 | 18 47 15.2 | 13.627 | 15 | 4 44 51.14 | 2.5299 | 26 49 58.2 | 6.095 |
| 16 | 2 48 49.27 | 2.3875 | 19 0 48.9 | 13.498 | 16 | 4 47 22.97 | 2.5311 | 26 55 58.6 | 5.918 |
| 17 | 2 51 12.64 | 2.3913 | 19 14 14.8 | 13.367 | 17 | 4 49 54.87 | 2.5323 | 27 1 48.4 | 5.742 |
| 18 | 2 53 36.23 | 2.3951 | 19 27 32.8 | 13.233 | 18 | 4 52 26.84 | 2.5334 | 27 7 27.6 | 5.564 |
| 19 | 2 56 0.05 | 2.3989 | 19 40 42.8 | 13.101 | 19 | 4 54 58.87 | 2.5340 | 27 12 56.1 | 5.385 |
| 20 | 2 58 24.10 | 2.4027 | 19 53 44.8 | 12.966 | 20 | 4 57 30.95 | 2.5352 | 27 18 13.9 | 5.209 |
| 21 | 3 0 48.38 | 2.4065 | 20 6 38.7 | 12.829 | 21 | 5 0 3.07 | 2.5360 | 27 23 21.1 | 5.031 |
| 22 | 3 3 12.88 | 2.4103 | 20 19 24.3 | 12.691 | 22 | 5 2 35.24 | 2.5364 | 27 28 17.6 | 4.852 |
| 23 | 3 5 37.62 | 2.4143 | N.20 32 1.6 | 12.553 | 23 | 5 5 7.43 | 2.5365 | N 27 33 3.4 | 4.674 |
| | THURSDAY 18. | | | | | SATURDAY 20. | | | |
| 0 | 3 8 2.60 | 2.4186 | N 20 44 30.6 | 12.415 | 0 | 5 7 39.63 | 2.5369 | N.27 37 38.5 | 4.497 |
| 1 | 3 10 27.82 | 2.4220 | 20 56 51.2 | 12.272 | 1 | 5 10 11.85 | 2.5371 | 27 42 2.9 | 4.316 |
| 2 | 3 12 53.25 | 2.4255 | 21 9 3.2 | 12.128 | 2 | 5 12 44.08 | 2.5373 | 27 46 16.5 | 4.138 |
| 3 | 3 15 18.90 | 2.4297 | 21 21 6.6 | 11.982 | 3 | 5 15 16.32 | 2.5374 | 27 50 19.4 | 3.956 |
| 4 | 3 17 44.79 | 2.4333 | 21 33 1.2 | 11.838 | 4 | 5 17 48.56 | 2.5374 | 27 54 11.5 | 3.779 |
| 5 | 3 20 10.90 | 2.4370 | 21 44 47.1 | 11.693 | 5 | 5 20 20.78 | 2.5373 | 27 57 52.9 | 3.602 |
| 6 | 3 22 37.23 | 2.4407 | 21 56 24.2 | 11.543 | 6 | 5 22 52.98 | 2.5368 | 28 1 23.6 | 3.421 |
| 7 | 3 25 3.78 | 2.4444 | 22 7 52.3 | 11.393 | 7 | 5 25 25.16 | 2.5360 | 28 4 43.5 | 3.242 |
| 8 | 3 27 30.55 | 2.4481 | 22 19 11.4 | 11.243 | 8 | 5 27 57.29 | 2.5352 | 28 7 52.7 | 3.064 |
| 9 | 3 29 57.54 | 2.4517 | 22 30 21.5 | 11.092 | 9 | 5 30 29.36 | 2.5343 | 28 10 51.2 | 2.886 |
| 10 | 3 32 24.74 | 2.4553 | 22 41 22.4 | 10.938 | 10 | 5 33 1.39 | 2.5333 | 28 13 39.0 | 2.707 |
| 11 | 3 34 52.16 | 2.4588 | 22 52 14.0 | 10.784 | 11 | 5 35 33.36 | 2.5324 | 28 16 16.1 | 2.529 |
| 12 | 3 37 19.79 | 2.4622 | 23 2 56.3 | 10.626 | 12 | 5 38 5.27 | 2.5314 | 28 18 42.5 | 2.351 |
| 13 | 3 39 47.63 | 2.4655 | 23 13 29.1 | 10.466 | 13 | 5 40 37.11 | 2.5300 | 28 20 58.2 | 2.172 |
| 14 | 3 42 15.66 | 2.4688 | 23 23 52.4 | 10.311 | 14 | 5 43 8.86 | 2.5286 | 28 23 3.2 | 1.996 |
| 15 | 3 44 43.89 | 2.4721 | 23 34 6.4 | 10.156 | 15 | 5 45 40.51 | 2.5269 | 28 24 57.6 | 1.817 |
| 16 | 3 47 12.32 | 2.4754 | 23 44 11.1 | 10.001 | 16 | 5 48 12.07 | 2.5251 | 28 26 41.3 | 1.638 |
| 17 | 3 49 40.94 | 2.4787 | 23 54 6.3 | 9.840 | 17 | 5 50 43.52 | 2.5233 | 28 28 14.4 | 1.467 |
| 18 | 3 52 9.75 | 2.4820 | 24 3 51.8 | 9.677 | 18 | 5 53 14.86 | 2.5213 | 28 29 37.1 | 1.291 |
| 19 | 3 54 38.76 | 2.4849 | 24 13 27.5 | 9.513 | 19 | 5 55 46.08 | 2.5194 | 28 30 49.2 | 1.113 |
| 20 | 3 57 7.94 | 2.4877 | 24 22 53.3 | 9.348 | 20 | 5 58 17.18 | 2.5173 | 28 31 50.7 | 0.936 |
| 21 | 3 59 37.29 | 2.4906 | 24 32 9.2 | 9.183 | 21 | 6 0 48.15 | 2.5148 | 28 32 41.6 | 0.760 |
| 22 | 4 2 6.82 | 2.4936 | 24 41 15.2 | 9.017 | 22 | 6 3 18.96 | 2.5122 | 28 33 22.0 | 0.586 |
| 23 | 4 4 36.52 | 2.4963 | 24 50 11.2 | 8.850 | 23 | 6 5 49.62 | 2.5098 | 28 33 52.0 | 0.415 |
| 24 | 4 7 6.39 | 2.4993 | N.24 58 57.2 | 8.685 | 24 | 6 8 20.13 | 2.5073 | N.28 34 11.7 | 0.242 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SUNDAY 21. | | | | | TUESDAY 23. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 6 8 20.13 | 2.5072 | N.28 34 11.7 | 0.242 | 0 | 8 3 37.41 | 2.2669 | N.25 41 25.0 | 7.050 |
| 1 | 6 10 50.48 | 2.5044 | 28 34 21.0 | 0.069 | 1 | 8 5 53.23 | 2.2606 | 25 34 18.3 | 7.176 |
| 2 | 6 13 20.68 | 2.5015 | 28 34 19.9 | 0.104 | 2 | 8 8 8.67 | 2.2544 | 25 27 4.2 | 7.299 |
| 3 | 6 15 50.63 | 2.4985 | 28 34 8.5 | 0.276 | 3 | 8 10 23.73 | 2.2472 | 25 19 42.6 | 7.421 |
| 4 | 6 18 20.44 | 2.4953 | 28 33 46.7 | 0.447 | 4 | 8 12 38.38 | 2.2410 | 25 12 13.8 | 7.542 |
| 5 | 6 20 50.05 | 2.4920 | 28 33 14.8 | 0.617 | 5 | 8 14 52.62 | 2.2347 | 25 4 37.7 | 7.662 |
| 6 | 6 23 19.45 | 2.4886 | 28 32 32.7 | 0.787 | 6 | 8 17 6.52 | 2.2283 | 24 56 54.4 | 7.781 |
| 7 | 6 25 48.66 | 2.4850 | 28 31 40.4 | 0.956 | 7 | 8 19 20.02 | 2.2217 | 24 49 4.1 | 7.899 |
| 8 | 6 28 17.65 | 2.4813 | 28 30 38.0 | 1.123 | 8 | 8 21 33.12 | 2.2151 | 24 41 6.7 | 8.015 |
| 9 | 6 30 46.41 | 2.4776 | 28 29 25.6 | 1.290 | 9 | 8 23 45.83 | 2.2085 | 24 33 2.4 | 8.130 |
| 10 | 6 33 14.95 | 2.4738 | 28 28 3.2 | 1.457 | 10 | 8 25 58.14 | 2.2019 | 24 24 51.2 | 8.243 |
| 11 | 6 35 43.26 | 2.4698 | 28 26 30.8 | 1.623 | 11 | 8 28 10.06 | 2.1953 | 24 16 33.2 | 8.355 |
| 12 | 6 38 11.32 | 2.4656 | 28 24 48.4 | 1.789 | 12 | 8 30 21.59 | 2.1888 | 24 8 8.6 | 8.465 |
| 13 | 6 40 39.13 | 2.4614 | 28 22 56.2 | 1.954 | 13 | 8 32 32.72 | 2.1824 | 23 59 37.4 | 8.575 |
| 14 | 6 43 6.69 | 2.4579 | 28 20 54.2 | 2.119 | 14 | 8 34 43.47 | 2.1759 | 23 50 59.6 | 8.684 |
| 15 | 6 45 34.00 | 2.4529 | 28 18 42.2 | 2.282 | 15 | 8 36 53.83 | 2.1694 | 23 42 15.3 | 8.792 |
| 16 | 6 48 1.04 | 2.4485 | 28 16 20.5 | 2.442 | 16 | 8 39 3.80 | 2.1629 | 23 33 24.6 | 8.898 |
| 17 | 6 50 27.80 | 2.4439 | 28 13 49.3 | 2.602 | 17 | 8 41 13.38 | 2.1563 | 23 24 27.6 | 9.003 |
| 18 | 6 52 54.29 | 2.4392 | 28 11 8.5 | 2.761 | 18 | 8 43 22.56 | 2.1498 | 23 15 24.3 | 9.107 |
| 19 | 6 55 20.50 | 2.4344 | 28 8 18.0 | 2.919 | 19 | 8 45 31.36 | 2.1433 | 23 6 14.8 | 9.210 |
| 20 | 6 57 46.42 | 2.4296 | 28 5 18.1 | 3.077 | 20 | 8 47 39.77 | 2.1371 | 22 56 59.2 | 9.311 |
| 21 | 7 0 12.05 | 2.4248 | 28 2 8.7 | 3.234 | 21 | 8 49 47.80 | 2.1305 | 22 47 37.5 | 9.412 |
| 22 | 7 2 37.39 | 2.4198 | 27 58 49.9 | 3.390 | 22 | 8 51 55.44 | 2.1242 | 22 38 9.9 | 9.510 |
| 23 | 7 5 2.42 | 2.4147 | N.27 55 21.9 | 3.545 | 23 | 8 54 2.70 | 2.1177 | N.22 28 36.4 | 9.608 |
| | MONDAY 22. | | | | | WEDNESDAY 24. | | | |
| 0 | 7 7 27.13 | 2.4095 | N.27 51 44.6 | 3.699 | 0 | 8 56 9.57 | 2.1113 | N.22 18 57.0 | 9.705 |
| 1 | 7 9 51.55 | 2.4042 | 27 47 58.1 | 3.852 | 1 | 8 58 16.06 | 2.1050 | 22 9 11.9 | 9.800 |
| 2 | 7 12 15.64 | 2.3988 | 27 44 2.5 | 4.004 | 2 | 9 0 22.17 | 2.0986 | 21 59 21.1 | 9.894 |
| 3 | 7 14 39.40 | 2.3933 | 27 39 57.9 | 4.154 | 3 | 9 2 27.90 | 2.0924 | 21 49 24.7 | 9.986 |
| 4 | 7 17 2.84 | 2.3878 | 27 35 44.2 | 4.303 | 4 | 9 4 33.26 | 2.0863 | 21 39 22.8 | 10.077 |
| 5 | 7 19 25.94 | 2.3823 | 27 31 21.6 | 4.450 | 5 | 9 6 38.25 | 2.0800 | 21 29 15.4 | 10.167 |
| 6 | 7 21 48.70 | 2.3767 | 27 26 50.2 | 4.597 | 6 | 9 8 42.86 | 2.0736 | 21 19 2.7 | 10.256 |
| 7 | 7 24 11.14 | 2.3710 | 27 22 10.0 | 4.743 | 7 | 9 10 47.09 | 2.0674 | 21 8 44.7 | 10.344 |
| 8 | 7 26 33.23 | 2.3652 | 27 17 21.0 | 4.888 | 8 | 9 12 50.96 | 2.0612 | 20 58 21.4 | 10.432 |
| 9 | 7 28 54.97 | 2.3594 | 27 12 23.2 | 5.032 | 9 | 9 14 54.45 | 2.0552 | 20 47 52.8 | 10.519 |
| 10 | 7 31 16.36 | 2.3536 | 27 7 16.8 | 5.175 | 10 | 9 16 57.58 | 2.0492 | 20 37 19.1 | 10.604 |
| 11 | 7 33 37.40 | 2.3477 | 27 2 2.0 | 5.317 | 11 | 9 19 0.35 | 2.0432 | 20 26 40.4 | 10.684 |
| 12 | 7 35 58.08 | 2.3418 | 26 56 38.8 | 5.457 | 12 | 9 21 2.76 | 2.0373 | 20 15 56.8 | 10.768 |
| 13 | 7 38 18.41 | 2.3358 | 26 51 7.2 | 5.597 | 13 | 9 23 4.82 | 2.0314 | 20 5 8.3 | 10.850 |
| 14 | 7 40 38.37 | 2.3296 | 26 45 27.2 | 5.737 | 14 | 9 25 6.53 | 2.0255 | 19 54 14.9 | 10.931 |
| 15 | 7 42 57.96 | 2.3234 | 26 39 38.8 | 5.875 | 15 | 9 27 7.88 | 2.0196 | 19 43 16.7 | 11.011 |
| 16 | 7 45 17.18 | 2.3172 | 26 33 42.2 | 6.011 | 16 | 9 29 8.88 | 2.0137 | 19 32 13.8 | 11.089 |
| 17 | 7 47 36.03 | 2.3110 | 26 27 37.6 | 6.145 | 17 | 9 31 9.53 | 2.0079 | 19 21 6.2 | 11.165 |
| 18 | 7 49 54.51 | 2.3048 | 26 21 25.1 | 6.278 | 18 | 9 33 9.83 | 2.0022 | 19 9 54.1 | 11.240 |
| 19 | 7 52 12.61 | 2.2985 | 26 15 4.6 | 6.410 | 19 | 9 35 9.79 | 1.9966 | 18 58 37.5 | 11.314 |
| 20 | 7 54 30.33 | 2.2922 | 26 8 36.2 | 6.540 | 20 | 9 37 9.42 | 1.9910 | 18 47 16.5 | 11.388 |
| 21 | 7 56 47.67 | 2.2858 | 26 1 59.9 | 6.669 | 21 | 9 39 8.71 | 1.9854 | 18 35 51.1 | 11.460 |
| 22 | 7 59 4.63 | 2.2795 | 25 55 15.8 | 6.797 | 22 | 9 41 7.66 | 1.9799 | 18 24 21.4 | 11.531 |
| 23 | 8 1 21.21 | 2.2732 | 25 48 24.2 | 6.924 | 23 | 9 43 6.29 | 1.9745 | 18 12 47.5 | 11.601 |
| 24 | 8 3 37.41 | 2.2669 | N.25 41 25.0 | 7.050 | 24 | 9 45 4.60 | 1.9691 | N.18 1 9.4 | 11.670 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 9 45 4.60 | 1.9691 | N.18 1 9.4 | 11.670 |
| 1 | 9 47 2.59 | 1.9637 | 17 49 27.2 | 11.738 |
| 2 | 9 49 0.25 | 1.9583 | 17 37 40.9 | 11.804 |
| 3 | 9 50 57.59 | 1.9530 | 17 25 50.7 | 11.869 |
| 4 | 9 52 54.61 | 1.9478 | 17 13 56.6 | 11.934 |
| 5 | 9 54 51.33 | 1.9427 | 17 1 58.6 | 11.999 |
| 6 | 9 56 47.75 | 1.9377 | 16 49 56.7 | 12.063 |
| 7 | 9 58 43.86 | 1.9327 | 16 37 51.1 | 12.123 |
| 8 | 10 0 39.67 | 1.9277 | 16 25 41.9 | 12.183 |
| 9 | 10 2 35.18 | 1.9227 | 16 13 29.1 | 12.244 |
| 10 | 10 4 30.39 | 1.9178 | 16 1 12.7 | 12.303 |
| 11 | 10 6 25.31 | 1.9130 | 15 48 52.8 | 12.361 |
| 12 | 10 8 19.95 | 1.9082 | 15 36 29.5 | 12.418 |
| 13 | 10 10 14.30 | 1.9035 | 15 24 2.8 | 12.473 |
| 14 | 10 12 8.37 | 1.8988 | 15 11 32.8 | 12.527 |
| 15 | 10 14 2.16 | 1.8942 | 14 58 59.6 | 12.580 |
| 16 | 10 15 55.68 | 1.8897 | 14 46 23.2 | 12.632 |
| 17 | 10 17 48.93 | 1.8852 | 14 33 43.7 | 12.684 |
| 18 | 10 19 41.91 | 1.8808 | 14 21 1.1 | 12.735 |
| 19 | 10 21 34.63 | 1.8765 | 14 8 15.6 | 12.784 |
| 20 | 10 23 27.10 | 1.8723 | 13 55 27.1 | 12.833 |
| 21 | 10 25 19.31 | 1.8681 | 13 42 35.7 | 12.881 |
| 22 | 10 27 11.27 | 1.8639 | 13 29 41.4 | 12.928 |
| 23 | 10 29 2.98 | 1.8598 | N.13 16 44.3 | 12.974 |

### FRIDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 10 30 54.44 | 1.8558 | N.13 3 44.5 | 13.020 |
| 1 | 10 32 45.67 | 1.8518 | 12 50 42.0 | 13.064 |
| 2 | 10 34 36.66 | 1.8479 | 12 37 36.9 | 13.106 |
| 3 | 10 36 27.41 | 1.8441 | 12 24 29.3 | 13.148 |
| 4 | 10 38 17.95 | 1.8403 | 12 11 19.1 | 13.189 |
| 5 | 10 40 8.26 | 1.8367 | 11 58 6.5 | 13.230 |
| 6 | 10 41 58.35 | 1.8331 | 11 44 51.4 | 13.271 |
| 7 | 10 43 48.22 | 1.8296 | 11 31 34.0 | 13.310 |
| 8 | 10 45 37.88 | 1.8259 | 11 18 14.3 | 13.347 |
| 9 | 10 47 27.32 | 1.8224 | 11 4 52.4 | 13.384 |
| 10 | 10 49 16.56 | 1.8190 | 10 51 28.3 | 13.420 |
| 11 | 10 51 5.60 | 1.8157 | 10 38 2.1 | 13.455 |
| 12 | 10 52 54.45 | 1.8125 | 10 24 33.8 | 13.489 |
| 13 | 10 54 43.11 | 1.8094 | 10 11 3.5 | 13.522 |
| 14 | 10 56 31.58 | 1.8063 | 9 57 31.2 | 13.555 |
| 15 | 10 58 19.85 | 1.8032 | 9 43 56.9 | 13.587 |
| 16 | 11 0 7.95 | 1.8001 | 9 30 20.8 | 13.617 |
| 17 | 11 1 55.87 | 1.7971 | 9 16 42.9 | 13.647 |
| 18 | 11 3 43.61 | 1.7941 | 9 3 3.2 | 13.676 |
| 19 | 11 5 31.18 | 1.7916 | 8 49 21.7 | 13.705 |
| 20 | 11 7 18.59 | 1.7887 | 8 35 38.6 | 13.732 |
| 21 | 11 9 5.84 | 1.7863 | 8 21 53.9 | 13.758 |
| 22 | 11 10 52.94 | 1.7837 | 8 8 7.7 | 13.784 |
| 23 | 11 12 39.88 | 1.7808 | 7 54 19.9 | 13.809 |
| 24 | 11 14 26.66 | 1.7786 | N. 7 40 30.6 | 13.833 |

### SATURDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 11 14 26.66 | 1.7786 | N. 7 40 30.6 | 13.833 |
| 1 | 11 16 13.30 | 1.7761 | 7 26 40.0 | 13.857 |
| 2 | 11 17 59.80 | 1.7738 | 7 12 48.0 | 13.880 |
| 3 | 11 19 46.17 | 1.7716 | 6 58 54.5 | 13.902 |
| 4 | 11 21 32.40 | 1.7694 | 6 44 59.8 | 13.922 |
| 5 | 11 23 18.50 | 1.7673 | 6 31 3.9 | 13.941 |
| 6 | 11 25 4.48 | 1.7653 | 6 17 6.9 | 13.960 |
| 7 | 11 26 50.34 | 1.7633 | 6 3 8.8 | 13.979 |
| 8 | 11 28 36.08 | 1.7613 | 5 49 9.5 | 13.997 |
| 9 | 11 30 21.70 | 1.7594 | 5 35 9.2 | 14.014 |
| 10 | 11 32 7.21 | 1.7576 | 5 21 7.9 | 14.030 |
| 11 | 11 33 52.62 | 1.7559 | 5 7 5.7 | 14.044 |
| 12 | 11 35 37.93 | 1.7543 | 4 53 2.7 | 14.058 |
| 13 | 11 37 23.14 | 1.7527 | 4 38 58.8 | 14.072 |
| 14 | 11 39 8.26 | 1.7512 | 4 24 54.1 | 14.085 |
| 15 | 11 40 53.29 | 1.7497 | 4 10 48.7 | 14.097 |
| 16 | 11 42 38.23 | 1.7483 | 3 56 42.5 | 14.108 |
| 17 | 11 44 23.09 | 1.7469 | 3 42 35.7 | 14.118 |
| 18 | 11 46 7.87 | 1.7457 | 3 28 28.3 | 14.128 |
| 19 | 11 47 52.58 | 1.7446 | 3 14 20.3 | 14.137 |
| 20 | 11 49 37.22 | 1.7435 | 3 0 11.8 | 14.145 |
| 21 | 11 51 21.79 | 1.7425 | 2 46 2.9 | 14.152 |
| 22 | 11 53 6.31 | 1.7416 | 2 31 53.6 | 14.159 |
| 23 | 11 54 50.77 | 1.7406 | N. 2 17 43.9 | 14.165 |

### SUNDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 56 35.17 | 1.7396 | N. 2 3 33.8 | 14.170 |
| 1 | 11 58 19.52 | 1.7388 | 1 49 23.4 | 14.176 |
| 2 | 12 0 3.83 | 1.7381 | 1 35 12.8 | 14.179 |
| 3 | 12 1 48.11 | 1.7375 | 1 21 2.0 | 14.181 |
| 4 | 12 3 32.35 | 1.7369 | 1 6 51.1 | 14.183 |
| 5 | 12 5 16.55 | 1.7363 | 0 52 40.1 | 14.184 |
| 6 | 12 7 0.71 | 1.7358 | 0 38 29.0 | 14.185 |
| 7 | 12 8 44.85 | 1.7354 | 0 24 17.9 | 14.185 |
| 8 | 12 10 28.97 | 1.7352 | N. 0 10 6.8 | 14.184 |
| 9 | 12 12 13.08 | 1.7350 | S. 0 4 4.3 | 14.183 |
| 10 | 12 13 57.18 | 1.7349 | 0 18 15.2 | 14.181 |
| 11 | 12 15 41.27 | 1.7347 | 0 32 25.9 | 14.178 |
| 12 | 12 17 25.35 | 1.7346 | 0 46 36.3 | 14.173 |
| 13 | 12 19 9.42 | 1.7346 | 1 0 46.5 | 14.168 |
| 14 | 12 20 53.50 | 1.7348 | 1 14 56.4 | 14.162 |
| 15 | 12 22 37.59 | 1.7349 | 1 29 5.9 | 14.155 |
| 16 | 12 24 21.69 | 1.7351 | 1 43 15.0 | 14.148 |
| 17 | 12 26 5.80 | 1.7353 | 1 57 23.7 | 14.140 |
| 18 | 12 27 49.92 | 1.7356 | 2 11 32.0 | 14.132 |
| 19 | 12 29 34.07 | 1.7358 | 2 25 39.7 | 14.123 |
| 20 | 12 31 18.24 | 1.7363 | 2 39 46.8 | 14.113 |
| 21 | 12 33 2.45 | 1.7370 | 2 53 53.3 | 14.103 |
| 22 | 12 34 46.69 | 1.7377 | 3 7 59.1 | 14.092 |
| 23 | 12 36 30.97 | 1.7383 | 3 22 4.2 | 14.079 |
| 24 | 12 38 15.29 | 1.7391 | S. 3 36 8.5 | 14.066 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| MONDAY 29. | | | | | TUESDAY 30. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 38 15.29 | 1.7391 | S. 3 36 8.5 | 14.066 | 0 | 13 20 21.53 | 1.7758 | S. 9 8 6.2 | 13.525 |
| 1 | 12 39 59.66 | 1.7399 | 3 50 12.0 | 14.052 | 1 | 13 22 8.15 | 1.7781 | 9 21 36.6 | 13.492 |
| 2 | 12 41 44.08 | 1.7407 | 4 4 14.7 | 14.038 | 2 | 13 23 54.91 | 1.7805 | 9 35 5.0 | 13.458 |
| 3 | 12 43 28.55 | 1.7416 | 4 18 16.5 | 14.023 | 3 | 13 25 41.81 | 1.7830 | 9 48 31.5 | 13.424 |
| 4 | 12 45 13.07 | 1.7426 | 4 32 17.4 | 14.007 | 4 | 13 27 28.87 | 1.7856 | 10 1 55.9 | 13.389 |
| 5 | 12 46 57.66 | 1.7436 | 4 46 17.3 | 13.990 | 5 | 13 29 16.08 | 1.7882 | 10 15 18.2 | 13.354 |
| 6 | 12 48 42.30 | 1.7447 | 5 0 16.1 | 13.972 | 6 | 13 31 3.43 | 1.7908 | 10 28 38.3 | 13.318 |
| 7 | 12 50 27.02 | 1.7459 | 5 14 13.8 | 13.954 | 7 | 13 32 50.96 | 1.7935 | 10 41 56.3 | 13.281 |
| 8 | 12 52 11.81 | 1.7472 | 5 28 10.4 | 13.935 | 8 | 13 34 38.65 | 1.7962 | 10 55 12.0 | 13.243 |
| 9 | 12 53 56.68 | 1.7487 | 5 42 5.9 | 13.915 | 9 | 13 36 26.50 | 1.7989 | 11 8 25.4 | 13.203 |
| 10 | 12 55 41.64 | 1.7501 | 5 56 0.2 | 13.894 | 10 | 13 38 14.52 | 1.8017 | 11 21 36.4 | 13.163 |
| 11 | 12 57 26.68 | 1.7515 | 6 9 53.2 | 13.873 | 11 | 13 40 2.72 | 1.8047 | 11 34 45.0 | 13.123 |
| 12 | 12 59 11.79 | 1.7529 | 6 23 44.9 | 13.851 | 12 | 13 41 51.11 | 1.8077 | 11 47 51.3 | 13.083 |
| 13 | 13 0 56.99 | 1.7545 | 6 37 35.3 | 13.828 | 13 | 13 43 39.67 | 1.8107 | 12 0 55.1 | 13.042 |
| 14 | 13 2 42.30 | 1.7562 | 6 51 24.3 | 13.804 | 14 | 13 45 28.42 | 1.8138 | 12 13 56.3 | 12.999 |
| 15 | 13 4 27.72 | 1.7578 | 7 5 11.8 | 13.778 | 15 | 13 47 17.35 | 1.8171 | 12 26 54.8 | 12.956 |
| 16 | 13 6 13.24 | 1.7594 | 7 18 57.7 | 13.752 | 16 | 13 49 6.48 | 1.8204 | 12 39 50.7 | 12.911 |
| 17 | 13 7 58.86 | 1.7612 | 7 32 42.1 | 13.726 | 17 | 13 50 55.81 | 1.8237 | 12 52 43.9 | 12.866 |
| 18 | 13 9 44.59 | 1.7632 | 7 46 25.1 | 13.700 | 18 | 13 52 45.33 | 1.8270 | 13 5 34.4 | 12.819 |
| 19 | 13 11 30.44 | 1.7652 | 8 0 6.3 | 13.674 | 19 | 13 54 35.05 | 1.8304 | 13 18 22.0 | 12.771 |
| 20 | 13 13 16.41 | 1.7672 | 8 13 45.8 | 13.647 | 20 | 13 56 24.98 | 1.8338 | 13 31 6.8 | 12.723 |
| 21 | 13 15 2.49 | 1.7693 | 8 27 23.7 | 13.619 | 21 | 13 58 15.13 | 1.8373 | 13 43 48.7 | 12.675 |
| 22 | 13 16 48.71 | 1.7715 | 8 40 59.7 | 13.590 | 22 | 14 0 5.48 | 1.8407 | 13 56 27.7 | 12.626 |
| 23 | 13 18 35.06 | 1.7736 | 8 54 33.9 | 13.558 | 23 | 14 1 56.05 | 1.8444 | 14 9 3.7 | 12.576 |
| 24 | 13 20 21.53 | 1.7758 | S. 9 8 6.2 | 13.525 | 24 | 14 3 46.83 | 1.8481 | S. 14 21 36.6 | 12.524 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ☽ First Quarter, . . . . . . . . . | 7 | 3 | 56.9 |
| ○ Full Moon, . . . . . . . . . . | 14 | 2 | 8.5 |
| ☾ Last Quarter, . . . . . . . . . | 20 | 17 | 48.6 |
| ● New Moon, . . . . . . . . . . | 28 | 15 | 48.2 |

| | Day. | h. |
|---|---|---|
| ☾ Apogee, . . . . . . . . . . . . | 2 | 3.6 |
| ☾ Perigee, . . . . . . . . . . . . | 14 | 19.8 |
| ☾ Apogee, . . . . . . . . . . . . | 29 | 11.2 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun W. | 22 19 45 | 3471 | 23 40 41 | 3471 | 25 1 37 | 3471 | 26 22 34 | 3471 |
| | Mars E. | 48 10 37 | 3305 | 46 46 31 | 3308 | 45 22 29 | 3312 | 43 58 31 | 3315 |
| | Antares E. | 66 28 57 | 3058 | 64 59 56 | 3060 | 63 30 58 | 3063 | 62 2 3 | 3066 |
| 2 | Sun W. | 33 7 25 | 3469 | 34 28 24 | 3469 | 35 49 23 | 3469 | 37 10 22 | 3469 |
| | Mars E. | 36 59 32 | 3328 | 35 35 53 | 3329 | 34 12 15 | 3331 | 32 48 39 | 3332 |
| | Antares E. | 54 38 18 | 3077 | 53 9 40 | 3077 | 51 41 2 | 3079 | 50 12 27 | 3079 |
| | α Aquilæ E. | 104 12 45 | 3969 | 103 0 35 | 3959 | 101 48 14 | 3950 | 100 35 46 | 3942 |
| 3 | Sun W. | 43 55 31 | 3462 | 45 16 38 | 3460 | 46 37 47 | 3458 | 47 58 58 | 3454 |
| | Mars E. | 25 50 58 | 3336 | 24 27 28 | 3335 | 23 3 57 | 3336 | 21 40 27 | 3336 |
| | Antares E. | 42 49 29 | 3077 | 41 20 51 | 3077 | 39 52 13 | 3075 | 38 23 33 | 3072 |
| | α Aquilæ E. | 94 31 40 | 3915 | 93 18 36 | 3912 | 92 5 27 | 3909 | 90 52 16 | 3906 |
| 4 | Sun W. | 54 45 51 | 3436 | 56 7 27 | 3431 | 57 29 8 | 3426 | 58 50 55 | 3421 |
| | Spica W. | 14 59 18 | 3078 | 16 27 55 | 3069 | 17 56 42 | 3063 | 19 25 37 | 3056 |
| | Antares E. | 30 59 24 | 3058 | 29 30 23 | 3054 | 28 1 17 | 3048 | 26 32 4 | 3043 |
| | α Aquilæ E. | 84 45 50 | 3902 | 83 32 31 | 3902 | 82 19 14 | 3903 | 81 5 57 | 3906 |
| 5 | Sun W. | 65 41 39 | 3386 | 67 4 12 | 3377 | 68 26 55 | 3368 | 69 49 48 | 3358 |
| | Spica W. | 26 52 23 | 3019 | 28 22 12 | 3011 | 29 52 11 | 3002 | 31 22 21 | 2993 |
| | α Aquilæ E. | 75 0 20 | 3926 | 73 47 27 | 3933 | 72 34 41 | 3942 | 71 22 4 | 3960 |
| | Fomalhaut E. | 101 9 55 | 3224 | 99 44 14 | 3214 | 98 18 22 | 3205 | 96 52 19 | 3196 |
| 6 | Sun W. | 76 47 2 | 3306 | 78 11 6 | 3294 | 79 35 24 | 3282 | 80 59 56 | 3270 |
| | Spica W. | 38 56 3 | 2945 | 40 27 25 | 2933 | 41 59 2 | 2922 | 43 30 53 | 2910 |
| | α Aquilæ E. | 65 21 29 | 4013 | 64 10 2 | 4031 | 62 58 53 | 4050 | 61 48 3 | 4072 |
| | Fomalhaut E. | 89 39 9 | 3145 | 88 11 54 | 3134 | 86 44 26 | 3124 | 85 16 46 | 3114 |
| | α Pegasi E. | 110 44 53 | 3299 | 109 20 40 | 3282 | 107 56 7 | 3265 | 106 31 14 | 3247 |
| 7 | Sun W. | 88 6 33 | 3198 | 89 32 44 | 3184 | 90 59 12 | 3168 | 92 25 59 | 3153 |
| | Spica W. | 51 14 4 | 2846 | 52 47 33 | 2831 | 54 21 21 | 2816 | 55 55 28 | 2801 |
| | Mars W. | 19 48 27 | 3096 | 21 16 41 | 3080 | 22 45 15 | 3064 | 24 14 9 | 3047 |
| | α Aquilæ E. | 55 59 59 | 4223 | 54 51 55 | 4263 | 53 44 28 | 4309 | 52 37 44 | 4359 |
| | Fomalhaut E. | 77 55 7 | 3058 | 76 26 6 | 3047 | 74 56 51 | 3036 | 73 27 23 | 3025 |
| | α Pegasi E. | 99 21 49 | 3163 | 97 54 56 | 3148 | 96 27 44 | 3131 | 95 0 12 | 3114 |
| | Jupiter E. | 113 20 23 | 2805 | 111 46 2 | 2790 | 110 11 21 | 2775 | 108 36 21 | 2760 |
| 8 | Sun W. | 99 44 54 | 3067 | 101 13 44 | 3048 | 102 42 57 | 3030 | 104 12 32 | 3011 |
| | Spica W. | 63 51 1 | 2722 | 65 27 11 | 2706 | 67 3 43 | 2688 | 68 40 39 | 2672 |
| | Mars W. | 31 44 0 | 2959 | 33 15 4 | 2941 | 34 46 31 | 2922 | 36 18 22 | 2904 |
| | Antares W. | 17 56 34 | 2722 | 19 32 45 | 2704 | 21 9 19 | 2688 | 22 46 15 | 2671 |
| | Fomalhaut E. | 65 56 37 | 2971 | 64 25 48 | 2962 | 62 54 47 | 2952 | 61 23 34 | 2943 |
| | α Pegasi E. | 87 37 34 | 3034 | 86 8 4 | 3019 | 84 38 15 | 3004 | 83 8 7 | 2989 |
| | Jupiter E. | 100 36 16 | 2682 | 98 59 12 | 2665 | 97 21 45 | 2648 | 95 43 55 | 2630 |
| 9 | Sun W. | 111 46 25 | 2916 | 113 18 24 | 2894 | 114 50 50 | 2875 | 116 23 41 | 2855 |
| | Spica W. | 76 51 10 | 2581 | 78 30 31 | 2563 | 80 10 17 | 2545 | 81 50 28 | 2526 |
| | Mars W. | 44 3 35 | 2809 | 45 37 51 | 2789 | 47 12 33 | 2769 | 48 47 41 | 2750 |
| | Antares W. | 30 56 53 | 2580 | 32 36 15 | 2562 | 34 16 2 | 2543 | 35 56 15 | 2525 |
| | Fomalhaut E. | 53 44 58 | 2910 | 52 12 52 | 2907 | 50 40 42 | 2905 | 49 8 29 | 2906 |
| | α Pegasi E. | 75 32 49 | 2918 | 74 0 53 | 2905 | 72 28 41 | 2893 | 70 56 13 | 2882 |
| | Jupiter E. | 87 28 47 | 2542 | 85 48 32 | 2524 | 84 7 52 | 2506 | 82 26 46 | 2487 |
| 10 | Sun W. | 124 14 27 | 2753 | 125 49 56 | 2734 | 127 25 51 | 2713 | 129 2 13 | 2694 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 27 43 31 | 3470 | 29 4 29 | 3469 | 30 25 28 | 3469 | 31 46 27 | 3470 |
| | Mars | E. | 42 34 37 | 3318 | 41 10 46 | 3320 | 39 46 58 | 3324 | 38 23 14 | 3325 |
| | Antares | E. | 60 33 12 | 3069 | 59 4 24 | 3072 | 57 35 40 | 3073 | 56 6 58 | 3075 |
| 2 | Sun | W. | 38 31 21 | 3468 | 39 52 21 | 3467 | 41 13 23 | 3466 | 42 34 26 | 3463 |
| | Mars | E. | 31 25 5 | 3333 | 30 1 32 | 3334 | 28 38 0 | 3335 | 27 14 29 | 3335 |
| | Antares | E. | 48 43 52 | 3079 | 47 15 17 | 3079 | 45 46 42 | 3076 | 44 18 6 | 3078 |
| | α Aquilæ | E. | 99 23 9 | 3936 | 98 10 26 | 3929 | 96 57 36 | 3924 | 95 44 41 | 3919 |
| 3 | Sun | W. | 49 20 13 | 3452 | 50 41 31 | 3448 | 52 2 53 | 3444 | 53 24 20 | 3440 |
| | Mars | E. | 20 16 57 | 3337 | 18 53 28 | 3337 | 17 29 59 | 3338 | 16 6 31 | 3338 |
| | Antares | E. | 36 54 49 | 3071 | 35 26 4 | 3068 | 33 57 15 | 3065 | 32 28 22 | 3060 |
| | α Aquilæ | E. | 89 39 2 | 3904 | 88 25 45 | 3902 | 87 12 28 | 3901 | 85 59 9 | 3901 |
| 4 | Sun | W. | 60 12 48 | 3414 | 61 34 49 | 3406 | 62 56 58 | 3400 | 64 19 15 | 3393 |
| | Spica | W. | 20 54 41 | 3049 | 22 23 52 | 3042 | 23 53 14 | 3034 | 25 22 44 | 3027 |
| | Antares | E. | 25 2 45 | 3039 | 23 33 20 | 3033 | 22 3 48 | 3027 | 20 34 9 | 3020 |
| | α Aquilæ | E. | 79 52 43 | 3909 | 78 39 32 | 3912 | 77 26 24 | 3916 | 76 13 20 | 3919 |
| 5 | Sun | W. | 71 12 52 | 3349 | 72 36 7 | 3339 | 73 59 33 | 3329 | 75 23 11 | 3318 |
| | Spica | W. | 32 52 42 | 2985 | 34 23 13 | 2975 | 35 53 57 | 2965 | 37 24 54 | 2955 |
| | α Aquilæ | E. | 70 9 35 | 3959 | 68 57 15 | 3971 | 67 45 7 | 3983 | 66 33 11 | 3996 |
| | Fomalhaut | E. | 95 26 5 | 3186 | 93 59 39 | 3176 | 92 33 1 | 3166 | 91 6 11 | 3156 |
| 6 | Sun | W. | 82 24 43 | 3256 | 83 49 46 | 3242 | 85 15 5 | 3229 | 86 40 40 | 3214 |
| | Spica | W. | 45 2 59 | 2898 | 46 35 21 | 2885 | 48 7 59 | 2873 | 49 40 53 | 2859 |
| | α Aquilæ | E. | 60 37 34 | 4097 | 59 27 29 | 4122 | 58 17 49 | 4153 | 57 8 38 | 4184 |
| | Fomalhaut | E. | 83 48 53 | 3102 | 82 20 46 | 3091 | 80 52 26 | 3081 | 79 23 53 | 3070 |
| | α Pegasi | E. | 105 6 1 | 3231 | 103 40 28 | 3213 | 102 14 34 | 3197 | 100 48 21 | 3181 |
| 7 | Sun | W. | 93 53 5 | 3136 | 95 20 31 | 3119 | 96 48 18 | 3102 | 98 16 25 | 3084 |
| | Spica | W. | 57 29 53 | 2787 | 59 4 39 | 2771 | 60 39 45 | 2755 | 62 15 12 | 2738 |
| | Mars | W. | 25 43 24 | 3030 | 27 13 0 | 3012 | 28 42 58 | 2994 | 30 13 18 | 2977 |
| | α Aquilæ | E. | 51 31 46 | 4416 | 50 26 39 | 4479 | 49 22 28 | 4549 | 48 19 19 | 4626 |
| | Fomalhaut | E. | 71 57 41 | 3014 | 70 27 45 | 3002 | 68 57 35 | 2993 | 67 27 13 | 2981 |
| | α Pegasi | E. | 93 32 19 | 3098 | 92 4 7 | 3082 | 90 35 36 | 3066 | 89 6 45 | 3050 |
| | Jupiter | E. | 107 1 1 | 2745 | 105 25 21 | 2729 | 103 49 20 | 2714 | 102 12 59 | 2698 |
| 8 | Sun | W. | 105 42 31 | 2993 | 107 12 53 | 2973 | 108 43 39 | 2954 | 110 14 50 | 2935 |
| | Spiea | W. | 70 17 57 | 2654 | 71 55 39 | 2636 | 73 33 45 | 2618 | 75 12 16 | 2601 |
| | Mars | W. | 37 50 36 | 2885 | 39 23 14 | 2866 | 40 56 16 | 2847 | 42 29 43 | 2828 |
| | Antares | W. | 24 23 34 | 2652 | 26 1 18 | 2635 | 27 39 25 | 2617 | 29 17 57 | 2599 |
| | Fomalhaut | E. | 59 52 10 | 2935 | 58 20 35 | 2927 | 56 48 51 | 2920 | 55 16 58 | 2915 |
| | α Pegasi | E. | 81 37 40 | 2973 | 80 6 54 | 2959 | 78 35 50 | 2945 | 77 4 28 | 2931 |
| | Jupiter | E. | 94 5 41 | 2613 | 92 27 4 | 2596 | 90 48 3 | 2577 | 89 8 37 | 2560 |
| 9 | Sun | W. | 117 56 57 | 2835 | 119 30 40 | 2815 | 121 4 49 | 2794 | 122 39 25 | 2774 |
| | Spica | W. | 83 31 5 | 2507 | 85 12 9 | 2488 | 86 53 39 | 2469 | 88 35 36 | 2451 |
| | Mars | W. | 50 23 15 | 2729 | 51 59 16 | 2709 | 53 35 44 | 2689 | 55 12 39 | 2669 |
| | Antares | W. | 37 36 53 | 2506 | 39 17 59 | 2487 | 40 59 30 | 2468 | 42 41 29 | 2449 |
| | Fomalhaut | E. | 47 36 18 | 2907 | 46 4 8 | 2912 | 44 32 4 | 2920 | 43 0 10 | 2931 |
| | α Pegasi | E. | 69 23 31 | 2870 | 67 50 34 | 2860 | 66 17 24 | 2852 | 64 44 3 | 2843 |
| | Jupiter | E. | 80 45 14 | 2467 | 79 3 15 | 2448 | 77 20 49 | 2429 | 75 37 56 | 2411 |
| 10 | Sun | W. | 130 39 1 | 2674 | 132 16 16 | 2655 | 133 53 57 | 2635 | 135 32 5 | 2615 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 10 | Spica | W. | 90 17 58 | 2431 | 92 0 48 | 2412 | 93 44 5 | 2394 | 95 27 49 | 2375 |
| | Mars | W. | 56 50 0 | 2650 | 58 27 47 | 2630 | 60 6 1 | 2610 | 61 44 42 | 2591 |
| | Antares | W. | 44 23 53 | 2430 | 46 6 45 | 2411 | 47 50 4 | 2392 | 49 33 49 | 2373 |
| | Fomalhaut | E. | 41 28 31 | 2946 | 39 57 10 | 2965 | 38 26 13 | 2987 | 36 55 44 | 3012 |
| | α Pegasi | E. | 63 10 31 | 2836 | 61 36 50 | 2831 | 60 3 3 | 2828 | 58 29 11 | 2825 |
| | Jupiter | E. | 73 54 37 | 2392 | 72 10 51 | 2373 | 70 26 38 | 2355 | 68 41 59 | 2337 |
| | α Arietis | E. | 104 0 8 | 2476 | 102 18 21 | 2457 | 100 36 7 | 2438 | 98 53 26 | 2419 |
| 11 | Mars | W. | 70 4 48 | 2494 | 71 46 9 | 2477 | 73 27 55 | 2458 | 75 10 7 | 2441 |
| | Antares | W. | 58 19 21 | 2282 | 60 5 47 | 2264 | 61 52 39 | 2247 | 63 39 56 | 2231 |
| | α Pegasi | E. | 50 39 57 | 2848 | 49 6 31 | 2862 | 47 33 23 | 2879 | 46 0 37 | 2901 |
| | Jupiter | E. | 59 51 59 | 2245 | 58 4 39 | 2228 | 56 16 53 | 2210 | 54 28 41 | 2194 |
| | α Arietis | E. | 90 13 14 | 2328 | 88 27 53 | 2309 | 86 42 6 | 2291 | 84 55 54 | 2274 |
| 12 | Mars | W. | 83 47 13 | 2358 | 85 31 48 | 2343 | 87 16 45 | 2328 | 89 2 3 | 2314 |
| | Antares | W. | 72 42 30 | 2152 | 74 32 11 | 2137 | 76 22 14 | 2122 | 78 12 39 | 2109 |
| | α Pegasi | E. | 38 26 28 | 3115 | 36 58 37 | 3186 | 35 32 11 | 3272 | 34 7 27 | 3374 |
| | Jupiter | E. | 45 21 35 | 2116 | 43 31 0 | 2101 | 41 40 3 | 2087 | 39 48 44 | 2073 |
| | α Arietis | E. | 75 58 55 | 2198 | 74 10 24 | 2184 | 72 21 32 | 2171 | 70 32 21 | 2159 |
| | Aldebaran | E. | 106 30 40 | 2217 | 104 42 38 | 2202 | 102 54 13 | 2186 | 101 5 25 | 2173 |
| 13 | Mars | W. | 97 53 25 | 2253 | 99 40 34 | 2243 | 101 27 58 | 2234 | 103 15 35 | 2226 |
| | Antares | W. | 87 29 36 | 2050 | 89 21 52 | 2041 | 91 14 23 | 2031 | 93 7 9 | 2023 |
| | α Aquilæ | W. | 47 20 45 | 3925 | 48 33 39 | 3808 | 49 48 33 | 3701 | 51 5 19 | 3604 |
| | Jupiter | E. | 30 27 12 | 2016 | 28 34 3 | 2006 | 26 40 38 | 1996 | 24 46 57 | 1987 |
| | α Arietis | E. | 61 22 6 | 2108 | 59 31 19 | 2101 | 57 40 22 | 2094 | 55 49 13 | 2089 |
| | Aldebaran | E. | 91 56 23 | 2112 | 90 5 42 | 2102 | 88 14 45 | 2093 | 86 23 36 | 2086 |
| | Saturn | E. | 126 57 31 | 2107 | 125 6 42 | 2096 | 123 15 35 | 2085 | 121 24 12 | 2076 |
| 14 | Antares | W. | 102 33 51 | 1991 | 104 27 39 | 1987 | 106 21 33 | 1984 | 108 15 32 | 1982 |
| | α Aquilæ | W. | 57 52 33 | 3243 | 59 17 51 | 3190 | 60 44 12 | 3143 | 62 11 30 | 3100 |
| | α Arietis | E. | 46 31 59 | 2078 | 44 40 26 | 2081 | 42 48 57 | 2086 | 40 57 32 | 2090 |
| | Aldebaran | E. | 77 5 5 | 2067 | 75 12 59 | 2063 | 73 20 48 | 2062 | 71 28 35 | 2062 |
| | Saturn | E. | 112 3 57 | 2069 | 110 11 23 | 2063 | 108 18 41 | 2060 | 106 25 54 | 2057 |
| 15 | α Aquilæ | W. | 69 39 17 | 2949 | 71 10 34 | 2929 | 72 42 16 | 2912 | 74 14 19 | 2900 |
| | Fomalhaut | W. | 38 43 20 | 2525 | 40 23 58 | 2487 | 42 5 29 | 2454 | 43 47 47 | 2426 |
| | α Pegasi | W. | 24 37 57 | 4935 | 25 35 34 | 4541 | 26 38 50 | 4218 | 27 47 4 | 3944 |
| | Aldebaran | E. | 62 7 39 | 2062 | 60 15 41 | 2068 | 58 23 52 | 2074 | 56 32 13 | 2081 |
| | Saturn | E. | 97 1 15 | 2056 | 95 8 20 | 2057 | 93 15 28 | 2060 | 91 22 41 | 2063 |
| | Pollux | E. | 105 31 42 | 1982 | 103 37 40 | 1985 | 101 43 42 | 1988 | 99 49 49 | 1992 |
| 16 | α Aquilæ | W. | 81 57 40 | 2872 | 83 30 35 | 2873 | 85 3 29 | 2876 | 86 36 18 | 2883 |
| | Fomalhaut | W. | 52 27 9 | 2347 | 54 12 0 | 2339 | 55 57 3 | 2335 | 57 42 12 | 2332 |
| | α Pegasi | W. | 34 23 20 | 3148 | 35 50 31 | 3057 | 37 19 33 | 2980 | 38 50 11 | 2915 |
| | Jupiter | W. | 15 23 10 | 1987 | 17 17 4 | 1994 | 19 10 47 | 2003 | 21 4 17 | 2011 |
| | Aldebaran | E. | 47 17 30 | 2139 | 45 27 30 | 2155 | 43 37 55 | 2172 | 41 48 46 | 2192 |
| | Saturn | E. | 82 0 35 | 2064 | 80 8 40 | 2072 | 78 16 58 | 2081 | 76 25 29 | 2091 |
| | Pollux | E. | 90 22 14 | 2021 | 88 29 13 | 2029 | 86 36 24 | 2038 | 84 43 49 | 2046 |
| 17 | α Aquilæ | W. | 94 17 34 | 2944 | 95 48 57 | 2962 | 97 19 58 | 2981 | 98 50 34 | 3004 |
| | Fomalhaut | W. | 66 28 11 | 2342 | 68 13 9 | 2349 | 69 57 57 | 2355 | 71 42 36 | 2364 |
| | α Pegasi | W. | 46 40 14 | 2716 | 48 16 32 | 2694 | 49 53 20 | 2676 | 51 30 32 | 2663 |
| | Jupiter | W. | 30 28 9 | 2063 | 32 20 5 | 2076 | 34 11 41 | 2088 | 36 2 58 | 2102 |
| | Aldebaran | E. | 32 51 30 | 2329 | 31 6 13 | 2367 | 29 21 51 | 2410 | 27 38 31 | 2461 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | | | P. L. of Diff. | XVh. | | | P. L. of Diff. | XVIIIh. | | | P. L. of Diff. | XXIh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 10 | Spica | W. | 97 | 12 | 0 | 2356 | 98 | 56 | 38 | 2338 | 100 | 41 | 42 | 2320 | 102 | 27 | 13 | 2301 |
| | Mars | W. | 63 | 23 | 50 | 2571 | 65 | 3 | 25 | 2552 | 66 | 43 | 26 | 2533 | 68 | 23 | 54 | 2514 |
| | Antares | W. | 51 | 18 | 3 | 2355 | 53 | 2 | 42 | 2336 | 54 | 47 | 49 | 2318 | 56 | 33 | 22 | 2300 |
| | Fomalhaut | E. | 35 | 26 | 3 | 3061 | 33 | 57 | 6 | 3110 | 32 | 29 | 9 | 3170 | 31 | 2 | 24 | 3241 |
| | α Pegasi | E. | 56 | 55 | 15 | 2825 | 55 | 21 | 19 | 2826 | 53 | 47 | 25 | 2831 | 52 | 13 | 37 | 2837 |
| | Jupiter | E. | 66 | 56 | 54 | 2319 | 65 | 11 | 22 | 2299 | 63 | 25 | 21 | 2281 | 61 | 38 | 53 | 2263 |
| | α Arietis | E. | 97 | 10 | 18 | 2399 | 95 | 26 | 42 | 2380 | 93 | 42 | 39 | 2362 | 91 | 58 | 10 | 2344 |
| 11 | Mars | W. | 76 | 52 | 43 | 2424 | 78 | 35 | 44 | 2406 | 80 | 19 | 10 | 2389 | 82 | 3 | 0 | 2373 |
| | Antares | W. | 65 | 27 | 37 | 2214 | 67 | 15 | 44 | 2197 | 69 | 4 | 16 | 2181 | 70 | 53 | 12 | 2167 |
| | α Pegasi | E. | 44 | 28 | 20 | 2930 | 42 | 56 | 39 | 2963 | 41 | 25 | 40 | 3005 | 39 | 55 | 33 | 3055 |
| | Jupiter | E. | 52 | 40 | 4 | 2178 | 50 | 51 | 3 | 2161 | 49 | 1 | 37 | 2145 | 47 | 11 | 47 | 2131 |
| | α Arietis | E. | 83 | 9 | 17 | 2258 | 81 | 22 | 16 | 2242 | 79 | 34 | 51 | 2227 | 77 | 47 | 4 | 2212 |
| 12 | Mars | W. | 90 | 47 | 42 | 2300 | 92 | 33 | 41 | 2287 | 94 | 19 | 59 | 2276 | 96 | 6 | 34 | 2265 |
| | Antares | W. | 80 | 3 | 24 | 2096 | 81 | 54 | 30 | 2084 | 83 | 45 | 54 | 2072 | 85 | 37 | 37 | 2061 |
| | α Pegasi | E. | 32 | 44 | 41 | 3497 | 31 | 24 | 14 | 3645 | 30 | 6 | 28 | 3823 | 28 | 51 | 50 | 4082 |
| | Jupiter | E. | 37 | 57 | 3 | 2060 | 36 | 5 | 2 | 2048 | 34 | 12 | 42 | 2037 | 32 | 20 | 5 | 2026 |
| | α Arietis | E. | 68 | 42 | 51 | 2147 | 66 | 53 | 3 | 2136 | 65 | 2 | 59 | 2126 | 63 | 12 | 39 | 2117 |
| | Aldebaran | E. | 99 | 16 | 15 | 2159 | 97 | 26 | 46 | 2145 | 95 | 36 | 56 | 2134 | 93 | 46 | 47 | 2122 |
| 13 | Mars | W. | 105 | 3 | 25 | 2217 | 106 | 51 | 27 | 2210 | 108 | 39 | 40 | 2204 | 110 | 28 | 2 | 2198 |
| | Antares | W. | 95 | 0 | 7 | 2015 | 96 | 53 | 18 | 2008 | 98 | 46 | 40 | 2001 | 100 | 40 | 12 | 1997 |
| | α Aquilæ | W. | 52 | 23 | 49 | 3517 | 53 | 43 | 54 | 3438 | 55 | 5 | 28 | 3366 | 56 | 28 | 23 | 3301 |
| | Jupiter | E. | 22 | 53 | 3 | 1981 | 20 | 58 | 59 | 1977 | 19 | 4 | 48 | 1973 | 17 | 10 | 31 | 1970 |
| | α Arietis | E. | 53 | 57 | 57 | 2084 | 52 | 6 | 33 | 2081 | 50 | 15 | 5 | 2078 | 48 | 23 | 32 | 2078 |
| | Aldebaran | E. | 84 | 32 | 14 | 2077 | 82 | 40 | 40 | 2072 | 80 | 48 | 57 | 2066 | 78 | 57 | 5 | 2061 |
| | Saturn | E. | 119 | 32 | 34 | 2066 | 117 | 40 | 42 | 2058 | 115 | 48 | 38 | 2050 | 113 | 56 | 22 | 2044 |
| 14 | Antares | W. | 110 | 9 | 34 | 1981 | 112 | 3 | 39 | 1980 | 113 | 57 | 45 | 1980 | 115 | 51 | 51 | 1981 |
| | α Aquilæ | W. | 63 | 39 | 40 | 3062 | 65 | 8 | 36 | 3028 | 66 | 38 | 14 | 2998 | 68 | 8 | 29 | 2972 |
| | α Arietis | E. | 39 | 6 | 17 | 2097 | 37 | 15 | 13 | 2107 | 35 | 24 | 25 | 2119 | 33 | 33 | 55 | 2132 |
| | Aldebaran | E. | 69 | 36 | 21 | 2051 | 67 | 44 | 6 | 2053 | 65 | 51 | 54 | 2055 | 63 | 59 | 45 | 2057 |
| | Saturn | E. | 104 | 33 | 2 | 2025 | 102 | 40 | 7 | 2024 | 100 | 47 | 10 | 2024 | 98 | 54 | 13 | 2023 |
| 15 | α Aquilæ | W. | 75 | 46 | 38 | 2889 | 77 | 19 | 11 | 2880 | 78 | 51 | 55 | 2876 | 80 | 24 | 45 | 2872 |
| | Fomalhaut | W. | 45 | 30 | 45 | 2403 | 47 | 14 | 15 | 2384 | 48 | 58 | 12 | 2369 | 50 | 42 | 31 | 2356 |
| | α Pegasi | W. | 28 | 59 | 39 | 3722 | 30 | 16 | 3 | 3538 | 31 | 35 | 45 | 3386 | 32 | 58 | 18 | 3257 |
| | Aldebaran | E. | 54 | 40 | 44 | 2091 | 52 | 49 | 31 | 2101 | 50 | 58 | 33 | 2112 | 49 | 7 | 52 | 2124 |
| | Saturn | E. | 89 | 29 | 59 | 2039 | 87 | 37 | 25 | 2044 | 85 | 44 | 59 | 2050 | 83 | 52 | 42 | 2056 |
| | Pollux | E. | 97 | 56 | 2 | 1996 | 96 | 2 | 21 | 2001 | 94 | 8 | 49 | 2008 | 92 | 15 | 27 | 2014 |
| 16 | α Aquilæ | W. | 88 | 8 | 58 | 2890 | 89 | 41 | 30 | 2901 | 91 | 13 | 47 | 2912 | 92 | 45 | 50 | 2927 |
| | Fomalhaut | W. | 59 | 27 | 25 | 2330 | 61 | 12 | 41 | 2331 | 62 | 57 | 55 | 2334 | 64 | 43 | 5 | 2337 |
| | α Pegasi | W. | 40 | 22 | 11 | 2860 | 41 | 55 | 21 | 2816 | 43 | 29 | 30 | 2776 | 45 | 4 | 30 | 2742 |
| | Jupiter | W. | 22 | 57 | 34 | 2020 | 24 | 50 | 37 | 2030 | 26 | 43 | 24 | 2041 | 28 | 35 | 55 | 2052 |
| | Aldebaran | E. | 40 | 0 | 7 | 2214 | 38 | 12 | 0 | 2237 | 36 | 24 | 28 | 2266 | 34 | 37 | 38 | 2294 |
| | Saturn | E. | 74 | 34 | 16 | 2101 | 72 | 43 | 18 | 2112 | 70 | 52 | 37 | 2123 | 69 | 2 | 13 | 2135 |
| | Pollux | E. | 82 | 51 | 27 | 2057 | 80 | 59 | 22 | 2067 | 79 | 7 | 32 | 2079 | 77 | 16 | 0 | 2089 |
| 17 | α Aquilæ | W. | 100 | 20 | 42 | 3028 | 101 | 50 | 20 | 3053 | 103 | 19 | 27 | 3082 | 104 | 47 | 59 | 3111 |
| | Fomalhaut | W. | 73 | 27 | 2 | 2374 | 75 | 11 | 14 | 2384 | 76 | 55 | 11 | 2396 | 78 | 38 | 52 | 2408 |
| | α Pegasi | W. | 53 | 8 | 2 | 2652 | 54 | 45 | 47 | 2644 | 56 | 23 | 42 | 2638 | 58 | 1 | 45 | 2635 |
| | Jupiter | W. | 37 | 53 | 54 | 2115 | 39 | 44 | 30 | 2130 | 41 | 34 | 44 | 2143 | 43 | 24 | 37 | 2158 |
| | Aldebaran | E. | 25 | 56 | 23 | 2520 | 24 | 15 | 38 | 2591 | 22 | 36 | 30 | 2675 | 20 | 59 | 16 | 2769 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 17 | Saturn | E. | 67 12 7 | 2149 | 65 22 22 | 2161 | 63 32 56 | 2175 | 61 43 51 | 2190 |
| | Pollux | E. | 75 24 44 | 2102 | 73 33 48 | 2114 | 71 43 10 | 2127 | 69 52 52 | 2141 |
| | Sun | E. | 139 0 1 | 2403 | 137 16 30 | 2415 | 135 33 16 | 2428 | 133 50 21 | 2442 |
| 18 | Fomalhaut | W. | 80 22 16 | 2421 | 82 5 21 | 2434 | 83 48 7 | 2448 | 85 30 33 | 2463 |
| | *a* Pegasi | W. | 59 39 53 | 2635 | 61 18 1 | 2636 | 62 56 7 | 2638 | 64 34 10 | 2643 |
| | Jupiter | W. | 45 14 8 | 2173 | 47 3 16 | 2188 | 48 52 1 | 2203 | 50 40 24 | 2219 |
| | *a* Arietis | W. | 16 7 28 | 2795 | 17 42 3 | 2706 | 19 18 35 | 2643 | 20 56 32 | 2598 |
| | Saturn | E. | 52 44 6 | 2269 | 50 57 21 | 2287 | 49 11 2 | 2304 | 47 25 8 | 2322 |
| | Pollux | E. | 60 46 40 | 2213 | 58 58 32 | 2229 | 57 10 47 | 2245 | 55 23 26 | 2260 |
| | Sun | E. | 125 20 59 | 2519 | 123 40 12 | 2535 | 121 59 48 | 2552 | 120 19 47 | 2569 |
| 19 | Fomalhaut | W. | 93 57 13 | 2545 | 95 37 23 | 2563 | 97 17 9 | 2582 | 98 56 29 | 2601 |
| | *a* Pegasi | W. | 72 42 23 | 2683 | 74 19 26 | 2693 | 75 56 15 | 2704 | 77 32 49 | 2717 |
| | Jupiter | W. | 59 36 19 | 2300 | 61 22 18 | 2316 | 63 7 54 | 2333 | 64 53 6 | 2349 |
| | *a* Arietis | W. | 29 16 34 | 2520 | 30 57 20 | 2518 | 32 38 8 | 2520 | 34 18 52 | 2525 |
| | Saturn | E. | 38 42 35 | 2422 | 36 59 32 | 2444 | 35 17 0 | 2467 | 33 35 0 | 2490 |
| | Pollux | E. | 46 32 35 | 2343 | 44 47 38 | 2359 | 43 3 5 | 2376 | 41 18 56 | 2394 |
| | Sun | E. | 112 5 32 | 2656 | 110 27 53 | 2674 | 108 50 38 | 2691 | 107 13 46 | 2710 |
| 20 | *a* Pegasi | W. | 85 31 15 | 2787 | 87 6 0 | 2803 | 88 40 24 | 2818 | 90 14 29 | 2835 |
| | Jupiter | W. | 73 33 6 | 2432 | 75 15 55 | 2448 | 76 58 21 | 2464 | 78 40 25 | 2480 |
| | *a* Arietis | W. | 42 40 27 | 2566 | 44 20 8 | 2577 | 45 59 34 | 2589 | 47 38 44 | 2601 |
| | Aldebaran | W. | 14 40 53 | 3567 | 15 59 41 | 3395 | 17 22 3 | 3258 | 18 47 9 | 3151 |
| | Pollux | E. | 32 44 15 | 2478 | 31 2 31 | 2495 | 29 21 11 | 2511 | 27 40 13 | 2529 |
| | Sun | E. | 99 15 27 | 2799 | 97 40 58 | 2816 | 96 6 51 | 2834 | 94 33 7 | 2851 |
| 21 | *a* Pegasi | W. | 97 59 22 | 2920 | 99 31 15 | 2939 | 101 2 44 | 2958 | 102 33 50 | 2977 |
| | Jupiter | W. | 87 5 18 | 2558 | 88 45 11 | 2574 | 90 24 42 | 2589 | 92 3 52 | 2603 |
| | *a* Arietis | W. | 55 50 26 | 2663 | 57 27 55 | 2676 | 59 5 7 | 2689 | 60 42 2 | 2702 |
| | Aldebaran | W. | 26 15 1 | 2917 | 27 46 58 | 2903 | 29 19 17 | 2887 | 30 51 53 | 2877 |
| | Sun | E. | 86 49 58 | 2936 | 85 18 25 | 2952 | 83 47 12 | 2968 | 82 16 19 | 2984 |
| 22 | Jupiter | W. | 100 15 2 | 2669 | 101 52 24 | 2681 | 103 29 30 | 2694 | 105 6 18 | 2707 |
| | *a* Arietis | W. | 68 42 20 | 2764 | 70 17 35 | 2777 | 71 52 33 | 2788 | 73 27 16 | 2800 |
| | Aldebaran | W. | 38 36 30 | 2871 | 40 9 26 | 2874 | 41 42 18 | 2878 | 43 15 5 | 2883 |
| | Sun | E. | 74 46 43 | 3059 | 73 17 43 | 3073 | 71 49 1 | 3088 | 70 20 37 | 3101 |
| 23 | Jupiter | W. | 113 6 7 | 2767 | 114 41 18 | 2778 | 116 16 15 | 2788 | 117 50 58 | 2798 |
| | *a* Arietis | W. | 81 17 5 | 2856 | 82 50 20 | 2868 | 84 23 20 | 2877 | 85 56 8 | 2887 |
| | Aldebaran | W. | 50 57 15 | 2912 | 52 29 17 | 2920 | 54 1 11 | 2927 | 55 32 56 | 2934 |
| | Saturn | W. | 15 32 34 | 3141 | 16 59 54 | 3108 | 18 27 54 | 3079 | 19 56 29 | 3057 |
| | Sun | E. | 63 2 32 | 3165 | 61 35 41 | 3177 | 60 9 4 | 3188 | 58 42 40 | 3199 |
| 24 | *a* Arietis | W. | 93 36 56 | 2936 | 95 8 29 | 2944 | 96 39 52 | 2954 | 98 11 3 | 2962 |
| | Aldebaran | W. | 63 9 29 | 2969 | 64 40 21 | 2976 | 66 11 4 | 2981 | 67 41 40 | 2986 |
| | Saturn | W. | 27 23 51 | 3018 | 28 53 41 | 3017 | 30 23 33 | 3018 | 31 53 24 | 3018 |
| | Pollux | E. | 18 57 12 | 2904 | 20 29 26 | 2911 | 22 1 31 | 2918 | 23 33 27 | 2924 |
| | Sun | E. | 51 33 56 | 3252 | 50 8 48 | 3261 | 48 43 51 | 3270 | 47 19 5 | 3279 |
| 25 | Aldebaran | W. | 75 12 35 | 3020 | 76 42 23 | 3025 | 78 12 5 | 3031 | 79 41 39 | 3037 |
| | Saturn | W. | 39 22 12 | 3030 | 40 51 47 | 3034 | 42 21 18 | 3037 | 43 50 45 | 3040 |
| | Pollux | W. | 31 10 56 | 2959 | 32 42 0 | 2965 | 34 12 57 | 2971 | 35 43 46 | 2977 |
| | Sun | E. | 40 17 43 | 3319 | 38 53 54 | 3327 | 37 30 14 | 3334 | 36 6 42 | 3341 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 17 | Saturn | E. | 59 55 8 | 2204 | 58 6 47 | 2220 | 56 18 50 | 2236 | 54 31 16 | 2252 |
| | Pollux | E. | 68 2 55 | 2155 | 66 13 19 | 2169 | 64 24 4 | 2183 | 62 35 11 | 2198 |
| | Sun | E. | 132 7 46 | 2457 | 130 25 32 | 2472 | 128 43 39 | 2487 | 127 2 8 | 2503 |
| 18 | Fomalhaut | W. | 87 12 38 | 2479 | 88 54 21 | 2494 | 90 35 42 | 2511 | 92 16 40 | 2529 |
| | α Pegasi | W. | 66 12 7 | 2649 | 67 49 56 | 2655 | 69 27 36 | 2663 | 71 5 6 | 2672 |
| | Jupiter | W. | 52 28 23 | 2235 | 54 15 58 | 2251 | 56 3 9 | 2268 | 57 49 56 | 2284 |
| | α Arietis | W. | 22 35 30 | 2566 | 24 15 12 | 2545 | 25 55 22 | 2530 | 27 35 53 | 2523 |
| | Saturn | E. | 45 39 42 | 2341 | 43 54 42 | 2361 | 42 10 11 | 2381 | 40 26 9 | 2401 |
| | Pollux | E. | 53 36 28 | 2276 | 51 49 53 | 2293 | 50 3 43 | 2309 | 48 17 57 | 2326 |
| | Sun | E. | 118 40 9 | 2585 | 117 0 54 | 2603 | 115 22 3 | 2620 | 113 43 35 | 2638 |
| 19 | Fomalhaut | W. | 100 35 23 | 2619 | 102 13 52 | 2639 | 103 51 54 | 2658 | 105 29 30 | 2678 |
| | α Pegasi | W. | 79 9 6 | 2730 | 80 45 6 | 2744 | 82 20 48 | 2758 | 83 56 11 | 2772 |
| | Jupiter | W. | 66 37 54 | 2366 | 68 22 18 | 2382 | 70 6 18 | 2399 | 71 49 54 | 2416 |
| | α Arietis | W. | 35 59 31 | 2530 | 37 40 3 | 2538 | 39 20 23 | 2547 | 41 0 31 | 2556 |
| | Saturn | E. | 31 53 33 | 2515 | 30 12 41 | 2542 | 28 32 26 | 2570 | 26 52 49 | 2600 |
| | Pollux | E. | 39 35 13 | 2410 | 37 51 52 | 2427 | 36 8 56 | 2443 | 34 26 23 | 2461 |
| | Sun | E. | 105 37 19 | 2727 | 104 1 15 | 2745 | 102 25 35 | 2763 | 100 50 19 | 2782 |
| 20 | α Pegasi | W. | 91 48 11 | 2852 | 93 21 31 | 2869 | 94 54 30 | 2886 | 96 27 7 | 2903 |
| | Jupiter | W. | 80 22 7 | 2495 | 82 3 27 | 2510 | 83 44 26 | 2526 | 85 25 3 | 2542 |
| | α Arietis | W. | 49 17 39 | 2613 | 50 56 15 | 2626 | 52 34 35 | 2638 | 54 12 38 | 2650 |
| | Aldebaran | W. | 20 14 17 | 3075 | 21 42 57 | 3017 | 23 12 49 | 2974 | 24 43 34 | 2941 |
| | Pollux | E. | 25 59 40 | 2545 | 24 19 30 | 2563 | 22 39 44 | 2579 | 21 0 20 | 2595 |
| | Sun | E. | 92 59 45 | 2869 | 91 26 46 | 2885 | 89 54 8 | 2902 | 88 21 52 | 2920 |
| 21 | α Pegasi | W. | 104 4 31 | 2996 | 105 34 49 | 3015 | 107 4 43 | 3035 | 108 34 12 | 3056 |
| | Jupiter | W. | 93 42 43 | 2617 | 95 21 15 | 2631 | 96 59 28 | 2644 | 98 37 23 | 2656 |
| | α Arietis | W. | 62 18 39 | 2714 | 63 55 0 | 2727 | 65 31 4 | 2741 | 67 6 50 | 2753 |
| | Aldebaran | W. | 32 24 41 | 2873 | 33 57 35 | 2869 | 35 30 33 | 2869 | 37 3 32 | 2869 |
| | Sun | E. | 80 45 46 | 2999 | 79 15 32 | 3014 | 77 45 37 | 3030 | 76 16 1 | 3044 |
| 22 | Jupiter | W. | 106 42 49 | 2719 | 108 19 3 | 2732 | 109 55 0 | 2744 | 111 30 41 | 2756 |
| | α Arietis | W. | 75 1 44 | 2812 | 76 35 56 | 2823 | 78 9 54 | 2835 | 79 43 36 | 2845 |
| | Aldebaran | W. | 44 47 46 | 2889 | 46 20 19 | 2894 | 47 52 45 | 2900 | 49 25 3 | 2906 |
| | Sun | E. | 68 52 29 | 3114 | 67 24 36 | 3127 | 65 56 59 | 3140 | 64 29 38 | 3153 |
| 23 | Jupiter | W. | 119 25 28 | 2808 | 120 59 46 | 2818 | 122 33 51 | 2827 | 124 7 44 | 2836 |
| | α Arietis | W. | 87 28 43 | 2898 | 89 1 4 | 2908 | 90 33 13 | 2917 | 92 5 10 | 2926 |
| | Aldebaran | W. | 57 4 32 | 2941 | 58 35 59 | 2947 | 60 7 18 | 2954 | 61 38 28 | 2962 |
| | Saturn | W. | 21 25 31 | 3043 | 22 54 50 | 3032 | 24 24 23 | 3026 | 25 54 4 | 3020 |
| | Sun | E. | 57 16 30 | 3210 | 55 50 33 | 3220 | 54 24 48 | 3231 | 52 59 16 | 3242 |
| 24 | α Arietis | W. | 99 42 4 | 2969 | 101 12 55 | 2979 | 102 43 34 | 2986 | 104 14 4 | 2993 |
| | Aldebaran | W. | 69 12 7 | 2995 | 70 42 26 | 3001 | 72 12 37 | 3008 | 73 42 40 | 3014 |
| | Saturn | W. | 33 23 15 | 3019 | 34 53 4 | 3022 | 36 22 50 | 3024 | 37 52 33 | 3027 |
| | Pollux | E. | 25 5 15 | 2932 | 26 36 53 | 2939 | 28 8 22 | 2946 | 29 39 43 | 2952 |
| | Sun | E. | 45 54 29 | 3288 | 44 30 3 | 3296 | 43 5 47 | 3305 | 41 41 41 | 3312 |
| 25 | Aldebaran | W. | 81 11 6 | 3043 | 82 40 26 | 3048 | 84 9 39 | 3053 | 85 38 46 | 3058 |
| | Saturn | W. | 45 20 8 | 3043 | 46 49 27 | 3047 | 48 18 42 | 3052 | 49 47 51 | 3056 |
| | Pollux | W. | 37 14 27 | 2983 | 38 45 2 | 2988 | 40 15 29 | 2993 | 41 45 50 | 2999 |
| | Sun | E. | 34 43 18 | 3348 | 33 20 2 | 3354 | 31 56 53 | 3360 | 30 33 51 | 3366 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | | | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from Apparent Time.* | | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | | | Diff. for 1 hour. | *Apparent* Declination. | | | | Diff. for 1 hour | Semidiameter. | | | | | |
| | | h. | m. | s. | s. | | ° | ′ | ″ | ″ | ′ | ″ | s. | m. | s. | s. |
| Wed. | 1 | 12 | 31 | 7.67 | 9.069 | S. | 3 | 21 | 47.1 | 58.29 | 16 | 1.68 | 64.38 | 10 | 27.17 | 0.788 |
| Thur. | 2 | 12 | 34 | 45.42 | 9.082 | | 3 | 45 | 4.8 | 58.19 | 16 | 1.96 | 64.42 | 10 | 45.92 | 0.775 |
| Fri. | 3 | 12 | 38 | 23.50 | 9.095 | | 4 | 8 | 19.9 | 58.08 | 16 | 2.24 | 64.47 | 11 | 4.35 | 0.762 |
| Sat. | 4 | 12 | 42 | 1.89 | 9.109 | | 4 | 31 | 31.9 | 57.94 | 16 | 2.53 | 64.52 | 11 | 22.47 | 0.749 |
| *Sun.* | 5 | 12 | 45 | 40.64 | 9.124 | | 4 | 54 | 40.3 | 57.79 | 16 | 2.82 | 64.58 | 11 | 40.22 | 0.734 |
| Mon. | 6 | 12 | 49 | 19.73 | 9.140 | | 5 | 17 | 45.1 | 57.62 | 16 | 3.10 | 64.64 | 11 | 57.63 | 0.718 |
| Tues. | 7 | 12 | 52 | 59.22 | 9.156 | | 5 | 40 | 45.8 | 57.44 | 16 | 3.38 | 64.70 | 12 | 14.66 | 0.702 |
| Wed. | 8 | 12 | 56 | 39.11 | 9.173 | | 6 | 3 | 41.8 | 57.24 | 16 | 3.66 | 64.76 | 12 | 31.28 | 0.685 |
| Thur. | 9 | 13 | 0 | 19.42 | 9.191 | | 6 | 26 | 32.9 | 57.03 | 16 | 3.95 | 64.83 | 12 | 47.49 | 0.667 |
| Fri. | 10 | 13 | 4 | 0.18 | 9.210 | | 6 | 49 | 18.8 | 56.80 | 16 | 4.24 | 64.90 | 13 | 3.23 | 0.648 |
| Sat. | 11 | 13 | 7 | 41.40 | 9.230 | | 7 | 11 | 59.2 | 56.57 | 16 | 4.52 | 64.98 | 13 | 18.52 | 0.627 |
| *Sun.* | 12 | 13 | 11 | 23.08 | 9.250 | | 7 | 34 | 33.7 | 56.81 | 16 | 4.80 | 65.05 | 13 | 33.34 | 0.607 |
| Mon. | 13 | 13 | 15 | 5.31 | 9.271 | | 7 | 57 | 2.0 | 56.04 | 16 | 5.08 | 65.13 | 13 | 47.62 | 0.586 |
| Tues. | 14 | 13 | 18 | 48.07 | 9.293 | | 8 | 19 | 23.4 | 55.75 | 16 | 5.36 | 65.21 | 14 | 1.39 | 0.564 |
| Wed. | 15 | 13 | 22 | 31.37 | 9.317 | | 8 | 41 | 37.8 | 55.46 | 16 | 5.63 | 65.29 | 14 | 14.60 | 0.540 |
| Thur. | 16 | 13 | 26 | 15.24 | 9.342 | | 9 | 3 | 44.8 | 55.14 | 16 | 5.90 | 65.38 | 14 | 27.24 | 0.515 |
| Fri. | 17 | 13 | 29 | 59.71 | 9.367 | | 9 | 25 | 44.4 | 54.81 | 16 | 6.17 | 65.46 | 14 | 39.31 | 0.490 |
| Sat. | 18 | 13 | 33 | 44.79 | 9.392 | | 9 | 47 | 36.0 | 54.46 | 16 | 6.44 | 65.55 | 14 | 50.75 | 0.464 |
| *Sun.* | 19 | 13 | 37 | 30.49 | 9.419 | | 10 | 9 | 18.8 | 54.11 | 16 | 6.70 | 65.64 | 15 | 1.57 | 0.438 |
| Mon. | 20 | 13 | 41 | 16.85 | 9.447 | | 10 | 30 | 52.7 | 53.72 | 16 | 6.96 | 65.73 | 15 | 11.72 | 0.410 |
| Tues. | 21 | 13 | 45 | 3.90 | 9.476 | | 10 | 52 | 17.6 | 53.33 | 16 | 7.21 | 65.83 | 15 | 21.22 | 0.381 |
| Wed. | 22 | 13 | 48 | 51.66 | 9.505 | | 11 | 13 | 32.8 | 52.92 | 16 | 7.47 | 65.93 | 15 | 30.00 | 0.352 |
| Thur. | 23 | 13 | 52 | 40.08 | 9.534 | | 11 | 34 | 38.2 | 52.50 | 16 | 7.73 | 66.02 | 15 | 38.12 | 0.323 |
| Fri. | 24 | 13 | 56 | 29.23 | 9.564 | | 11 | 55 | 33.2 | 52.05 | 16 | 7.99 | 66.12 | 15 | 45.50 | 0.293 |
| Sat. | 25 | 14 | 0 | 19.11 | 9.595 | | 12 | 16 | 17.3 | 51.59 | 16 | 8.25 | 66.23 | 15 | 52.15 | 0.263 |
| *Sun.* | 26 | 14 | 4 | 9.72 | 9.626 | | 12 | 36 | 50.0 | 51.11 | 16 | 8.50 | 66.34 | 15 | 58.06 | 0.232 |
| Mon. | 27 | 14 | 8 | 1.08 | 9.657 | | 12 | 57 | 11.3 | 50.63 | 16 | 8.76 | 66.45 | 16 | 3.25 | 0.200 |
| Tues. | 28 | 14 | 11 | 53.22 | 9.688 | | 13 | 17 | 20.3 | 50.11 | 16 | 9.01 | 66.55 | 16 | 7.66 | 0.169 |
| Wed. | 29 | 14 | 15 | 46.12 | 9.720 | | 13 | 37 | 16.8 | 49.58 | 16 | 9.27 | 66.66 | 16 | 11.31 | 0.137 |
| Thur. | 30 | 14 | 19 | 39.79 | 9.753 | | 13 | 57 | 0.4 | 49.02 | 16 | 9.52 | 66.78 | 16 | 14.19 | 0.105 |
| Fri. | 31 | 14 | 23 | 34.22 | 9.786 | | 14 | 16 | 30.5 | 48.46 | 16 | 9.77 | 66.89 | 16 | 16.30 | 0.072 |
| Sat. | 32 | 14 | 27 | 29.46 | 9.819 | S. | 14 | 35 | 46.8 | 47.87 | 16 | 10.02 | 67.00 | 16 | 17.61 | 0.038 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S |  |  |  | Equation of Time, *to be added to Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
|  |  | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. |  |  |  |
|  |  | h. m. s. | s. | ° ′ ″ | ″ | m. s. | s. | h. m. s. |
| Wed. | 1 | 12 31 9.25 | 9.069 | S. 3 21 57.2 | 58.29 | 10 27.32 | 0.788 | 12 41 36.57 |
| Thur. | 2 | 12 34 47.05 | 9.082 | 3 45 15.1 | 58.19 | 10 46.07 | 0.775 | 12 45 33.11 |
| Fri. | 3 | 12 38 25.17 | 9.095 | 4 8 30.5 | 58.08 | 11 4.50 | 0.762 | 12 49 29.67 |
| Sat. | 4 | 12 42 3.61 | 9.109 | 4 31 42.8 | 57.94 | 11 22.62 | 0.749 | 12 53 26.23 |
| *Sun.* | 5 | 12 45 42.41 | 9.124 | 4 54 51.5 | 57.79 | 11 40.37 | 0.734 | 12 57 22.78 |
| Mon. | 6 | 12 49 21.55 | 9.140 | 5 17 56.5 | 57.62 | 11 57.78 | 0.718 | 13 1 19.33 |
| Tues. | 7 | 12 53 1.08 | 9.156 | 5 40 57.4 | 57.44 | 12 14.81 | 0.702 | 13 5 15.89 |
| Wed. | 8 | 12 56 41.02 | 9.173 | 6 3 53.7 | 57.24 | 12 31.42 | 0.685 | 13 9 12.44 |
| Thur. | 9 | 13 0 21.37 | 9.191 | 6 26 45.0 | 57.03 | 12 47.63 | 0.667 | 13 13 9.00 |
| Fri. | 10 | 13 4 2.18 | 9.210 | 6 49 31.1 | 56.80 | 13 3.37 | 0.648 | 13 17 5.55 |
| Sat. | 11 | 13 7 43.45 | 9.230 | 7 12 11.7 | 56.57 | 13 18.66 | 0.627 | 13 21 2.11 |
| *Sun.* | 12 | 13 11 25.18 | 9.250 | 7 34 46.3 | 56.31 | 13 33.48 | 0.607 | 13 24 58.66 |
| Mon. | 13 | 13 15 7.45 | 9.271 | 7 57 14.7 | 56.04 | 13 47.76 | 0.586 | 13 28 55.21 |
| Tues. | 14 | 13 18 50.25 | 9.293 | 8 19 36.3 | 55.75 | 14 1.52 | 0.564 | 13 32 51.77 |
| Wed. | 15 | 13 22 33.59 | 9.317 | 8 41 50.9 | 55.46 | 14 14.73 | 0.540 | 13 36 48.32 |
| Thur. | 16 | 13 26 17.50 | 9.342 | 9 3 58.1 | 55.14 | 14 27.37 | 0.515 | 13 40 44.87 |
| Fri. | 17 | 13 30 2.00 | 9.367 | 9 25 57.8 | 54.81 | 14 39.43 | 0.490 | 13 44 41.43 |
| Sat. | 18 | 13 33 47.12 | 9.392 | 9 47 49.4 | 54.46 | 14 50.87 | 0.464 | 13 48 37.99 |
| *Sun.* | 19 | 13 37 32.86 | 9.419 | 10 9 32.3 | 54.11 | 15 1.68 | 0.438 | 13 52 34.54 |
| Mon. | 20 | 13 41 19.27 | 9.447 | 10 31 6.3 | 53.72 | 15 11.83 | 0.410 | 13 56 31.10 |
| Tues. | 21 | 13 45 6.33 | 9.476 | 10 52 31.3 | 53.33 | 15 21.32 | 0.381 | 14 0 27.65 |
| Wed. | 22 | 13 48 54.11 | 9.505 | 11 13 46.5 | 52.92 | 15 30.09 | 0.352 | 14 4 24.20 |
| Thur. | 23 | 13 52 42.56 | 9.534 | 11 34 51.9 | 52.50 | 15 38.20 | 0.323 | 14 8 20.76 |
| Fri. | 24 | 13 56 31.73 | 9.564 | 11 55 46.9 | 52.05 | 15 45.58 | 0.293 | 14 12 17.31 |
| Sat. | 25 | 14 0 21.65 | 9.595 | 12 16 31.0 | 51.59 | 15 52.22 | 0.263 | 14 16 13.87 |
| *Sun.* | 26 | 14 4 12.29 | 9.626 | 12 37 3.7 | 51.11 | 15 58.13 | 0.232 | 14 20 10.42 |
| Mon. | 27 | 14 8 3.67 | 9.657 | 12 57 24.9 | 50.63 | 16 3.31 | 0.200 | 14 24 6.98 |
| Tues. | 28 | 14 11 55.82 | 9.688 | 13 17 33.8 | 50.11 | 16 7.71 | 0.169 | 14 28 3.53 |
| Wed. | 29 | 14 15 48.74 | 9.720 | 13 37 30.2 | 49.58 | 16 11.35 | 0.137 | 14 32 0.09 |
| Thur. | 30 | 14 19 42.43 | 9.753 | 13 57 13.6 | 49.02 | 16 14.22 | 0.105 | 14 35 56.65 |
| Fri. | 31 | 14 23 36.88 | 9.786 | 14 16 43.6 | 48.46 | 16 16.32 | 0.072 | 14 39 53.20 |
| Sat. | 32 | 14 27 32.13 | 9.819 | S.14 35 59.7 | 47.87 | 16 17.63 | 0.038 | 14 43 49.76 |

**Note.** — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S |  |  |  | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
|  |  | *True* LONGITUDE. |  | Diff. for 1 hour. | LATITUDE. |  |  |  |
|  |  | λ | λ′ |  |  |  |  |  |
|  |  | ° ′ ″ | ′ ″ | ″ | ″ |  |  | h. m. s. |
| 1 | 275 | 188 29 10.5 | 28 37.7 | 147.80 | —0.06 | 0.0001471 | 52.7 | 11 16 32.29 |
| 2 | 276 | 189 28 18.4 | 27 45.5 | 147.88 | 0.19 | 0.0000203 | 53.0 | 11 12 36.39 |
| 3 | 277 | 190 27 28.2 | 26 55.2 | 147.95 | 0.29 | 9.9998930 | 53.0 | 11 8 40.49 |
| 4 | 278 | 191 26 39.8 | 26 6.7 | 148.02 | 0.38 | .9997652 | 53.1 | 11 4 44.57 |
| 5 | 279 | 192 25 53.1 | 25 19.9 | 148.09 | 0.43 | .9996371 | 53.2 | 11 0 48.67 |
| 6 | 280 | 193 25 8.1 | 24 34.7 | 148.16 | 0.45 | .9995089 | 53.2 | 10 56 52.75 |
| 7 | 281 | 194 24 24.9 | 23 51.5 | 148.23 | 0.43 | .9993809 | 53.3 | 10 52 56.84 |
| 8 | 282 | 195 23 43.6 | 23 10.1 | 148.30 | 0.39 | .9992528 | 53.0 | 10 49 0.95 |
| 9 | 283 | 196 23 4.0 | 22 30.4 | 148.37 | 0.31 | .9991252 | 52.8 | 10 45 5.03 |
| 10 | 284 | 197 22 26.2 | 21 52.5 | 148.45 | 0.24 | .9989982 | 52.6 | 10 41 9.13 |
| 11 | 285 | 198 21 50.2 | 21 16.4 | 148.53 | —0.12 | .9988718 | 52.4 | 10 37 13.21 |
| 12 | 286 | 199 21 16.0 | 20 42.1 | 148.62 | +0.01 | .9987462 | 52.2 | 10 33 17.30 |
| 13 | 287 | 200 20 44.0 | 20 10.0 | 148.71 | 0.14 | .9986213 | 51.8 | 10 29 21.41 |
| 14 | 288 | 201 20 14.0 | 19 39.9 | 148.79 | 0.28 | .9984975 | 51.4 | 10 25 25.49 |
| 15 | 289 | 202 19 45.9 | 19 11.6 | 148.88 | 0.40 | .9983747 | 51.0 | 10 21 29.59 |
| 16 | 290 | 203 19 19.8 | 18 45.4 | 148.96 | 0.51 | .9982529 | 50.6 | 10 17 33.68 |
| 17 | 291 | 204 18 55.9 | 18 21.4 | 149.04 | 0.62 | .9981320 | 50.2 | 10 13 37.77 |
| 18 | 292 | 205 18 34.2 | 17 59.6 | 149.13 | 0.69 | .9980120 | 49.9 | 10 9 41.85 |
| 19 | 293 | 206 18 14.8 | 17 40.1 | 149.22 | 0.72 | .9978929 | 49.6 | 10 5 45.94 |
| 20 | 294 | 207 17 57.5 | 17 22.7 | 149.32 | 0.73 | .9977747 | 49.2 | 10 1 50.03 |
| 21 | 295 | 208 17 42.5 | 17 7.5 | 149.42 | 0.72 | .9976573 | 48.8 | 9 57 54.13 |
| 22 | 296 | 209 17 29.9 | 16 54.8 | 149.52 | 0.68 | .9975406 | 48.5 | 9 53 58.23 |
| 23 | 297 | 210 17 19.7 | 16 44.4 | 149.61 | 0.60 | .9974244 | 48.4 | 9 50 2.31 |
| 24 | 298 | 211 17 11.6 | 16 36.2 | 149.70 | 0.51 | .9973086 | 48.2 | 9 46 6.41 |
| 25 | 299 | 212 17 5.8 | 16 30.3 | 149.78 | 0.40 | .9971933 | 48.0 | 9 42 10.49 |
| 26 | 300 | 213 17 2.0 | 16 26.3 | 149.87 | 0.26 | .9970782 | 47.9 | 9 38 14.58 |
| 27 | 301 | 214 17 0.2 | 16 24.4 | 149.96 | +0.12 | .9969634 | 47.7 | 9 34 18.67 |
| 28 | 302 | 215 17 0.5 | 16 24.6 | 150.04 | 0.00 | .9968489 | 47.6 | 9 30 22.77 |
| 29 | 303 | 216 17 2.8 | 16 26.7 | 150.12 | —0.11 | .9967348 | 47.4 | 9 26 26.86 |
| 30 | 304 | 217 17 6.9 | 16 30.6 | 150.20 | 0.22 | .9966210 | 47.2 | 9 22 30.94 |
| 31 | 305 | 218 17 12.8 | 16 36.3 | 150.28 | 0.30 | .9965077 | 47.1 | 9 18 35.04 |
| 32 | 306 | 219 17 20.2 | 16 43.7 | 150.36 | —0.37 | 9.9963944 | 47.0 | 9 14 39.12 |

**Note.**—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 14 45.1 | 14 46.5 | 54 1.7 | +0.36 | 54 6.9 | +0.49 | 1 24.5 | 1.73 | 2.3 |
| 2 | 14 48.4 | 14 50.8 | 54 13.8 | 0.61 | 54 22.5 | 0.79 | 2 7.6 | 1.85 | 3.3 |
| 3 | 14 53.7 | 14 57.1 | 54 33.0 | 0.95 | 54 45.4 | 1.12 | 2 53.8 | 2.00 | 4.3 |
| 4 | 15 1.0 | 15 5.4 | 54 59.8 | 1.29 | 55 16.2 | 1.46 | 3 43.5 | 2.16 | 5.3 |
| 5 | 15 10.4 | 15 15.9 | 55 34.5 | 1.62 | 55 54.8 | 1.78 | 4 36.6 | 2.30 | 6.3 |
| 6 | 15 22.0 | 15 28.5 | 56 17.0 | 1.93 | 56 41.0 | 2.07 | 5 32.3 | 2.38 | 7.3 |
| 7 | 15 35.4 | 15 42.7 | 57 6.6 | 2.19 | 57 33.5 | 2.29 | 6 29.0 | 2.36 | 8.3 |
| 8 | 15 50.4 | 15 58.2 | 58 1.6 | 2.36 | 58 30.0 | 2.39 | 7 25.1 | 2.31 | 9.3 |
| 9 | 16 5.9 | 16 13.5 | 58 58.4 | 2.37 | 59 26.3 | 2.30 | 8 19.7 | 2.23 | 10.3 |
| 10 | 16 20.8 | 16 27.6 | 59 52.9 | 2.17 | 60 17.5 | 1.97 | 9 12.5 | 2.15 | 11.3 |
| 11 | 16 33.6 | 16 38.6 | 60 39.5 | 1.71 | 60 58.1 | 1.40 | 10 3.9 | 2.11 | 12.3 |
| 12 | 16 42.5 | 16 45.2 | 61 12.8 | 1.05 | 61 23.0 | +0.66 | 10 55.0 | 2.12 | 13.3 |
| 13 | 16 46.7 | 16 46.8 | 61 28.3 | +0.24 | 61 28.6 | −0.20 | 11 47.0 | 2.20 | 14.3 |
| 14 | 16 45.5 | 16 42.8 | 61 23.7 | −0.63 | 61 13.9 | 1.03 | 12 41.3 | 2.32 | 15.3 |
| 15 | 16 38.9 | 16 33.9 | 60 59.6 | 1.40 | 60 41.1 | 1.73 | 13 38.4 | 2.46 | 16.3 |
| 16 | 16 27.8 | 16 21.0 | 60 18.9 | 2.01 | 59 53.7 | 2.22 | 14 38.3 | 2.60 | 17.3 |
| 17 | 16 13.6 | 16 5.8 | 59 26.4 | 2.36 | 58 57.9 | 2.43 | 15 39.8 | 2.58 | 18.3 |
| 18 | 15 57.9 | 15 50.0 | 58 28.9 | 2.45 | 57 59.9 | 2.42 | 16 40.3 | 2.48 | 19.3 |
| 19 | 15 42.2 | 15 34.7 | 57 31.3 | 2.35 | 57 3.6 | 2.25 | 17 37.9 | 2.33 | 20.3 |
| 20 | 15 27.6 | 15 20.9 | 56 37.4 | 2.12 | 56 12.9 | 1.97 | 18 31.5 | 2.13 | 21.3 |
| 21 | 15 14.7 | 15 9.1 | 55 50.3 | 1.81 | 55 29.7 | 1.63 | 19 20.4 | 1.92 | 22.3 |
| 22 | 15 4.1 | 14 59.7 | 55 11.3 | 1.44 | 54 55.1 | 1.26 | 20 4.9 | 1.76 | 23.3 |
| 23 | 14 55.9 | 14 52.6 | 54 41.0 | 1.08 | 54 29.1 | 0.90 | 20 46.2 | 1.66 | 24.3 |
| 24 | 14 49.9 | 14 47.7 | 54 19.2 | 0.73 | 54 11.3 | 0.58 | 21 25.7 | 1.60 | 25.3 |
| 25 | 14 46.0 | 14 44.9 | 54 5.2 | 0.43 | 54 0.9 | 0.28 | 22 4.4 | 1.60 | 26.3 |
| 26 | 14 44.3 | 14 44.1 | 53 58.3 | −0.14 | 53 57.3 | −0.02 | 22 43.4 | 1.63 | 27.3 |
| 27 | 14 44.2 | 14 44 6 | 53 57.7 | +0.09 | 53 59.5 | +0.21 | 23 23.6 | 1.70 | 28.3 |
| 28 | 14 45.4 | 14 46.5 | 54 2.7 | 0.33 | 54 7.2 | 0.43 | ☌ | | 29.3 |
| 29 | 14 48.2 | 14 50.1 | 54 12.9 | 0.53 | 54 19.8 | 0.63 | 0 6.0 | 1.82 | 0.6 |
| 30 | 14 52.3 | 14 54.8 | 54 28.0 | 0.73 | 54 37.4 | 0.83 | 0 51.4 | 1.96 | 1.6 |
| 31 | 14 57.7 | 15 1.0 | 54 48.0 | 0.94 | 54 59.9 | 1.05 | 1 40.2 | 2.12 | 2.6 |
| 32 | 15 4.6 | 15 8.6 | 55 13.1 | +1.16 | 55 27.7 | +1.27 | 2 32.3 | 2.26 | 3.6 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | WEDNESDAY 1. | | | | | FRIDAY 3. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 3 46.83 | 1.8481 | S.14 21 36.6 | 12.524 | 0 | 15 37 42.25 | 2.0806 | S.23 6 10.9 | 8.966 |
| 1 | 14 5 37.84 | 1.8519 | 14 34 6.3 | 12.471 | 1 | 15 39 47.24 | 2.0863 | 23 15 5.9 | 8.867 |
| 2 | 14 7 29.08 | 1.8558 | 14 46 32.9 | 12.418 | 2 | 15 41 52.61 | 2.0920 | 23 23 54.9 | 8.768 |
| 3 | 14 9 20.54 | 1.8597 | 14 58 56.3 | 12.364 | 3 | 15 43 58.31 | 2.0977 | 23 32 37.9 | 8.668 |
| 4 | 14 11 12.24 | 1.8637 | 15 11 16.5 | 12.310 | 4 | 15 46 4.34 | 2.1033 | 23 41 14.9 | 8.565 |
| 5 | 14 13 4.18 | 1.8677 | 15 23 33.4 | 12.254 | 5 | 15 48 10.71 | 2.1089 | 23 49 45.7 | 8.462 |
| 6 | 14 14 56.36 | 1.8717 | 15 35 46.9 | 12.198 | 6 | 15 50 17.41 | 2.1145 | 23 58 10.3 | 8.359 |
| 7 | 14 16 48.78 | 1.8758 | 15 47 57.0 | 12.140 | 7 | 15 52 24.45 | 2.1202 | 24 6 28.7 | 8.255 |
| 8 | 14 18 41.45 | 1.8799 | 16 0 3.6 | 12.080 | 8 | 15 54 31.83 | 2.1260 | 24 14 40.8 | 8.149 |
| 9 | 14 20 34.37 | 1.8841 | 16 12 6.6 | 12.020 | 9 | 15 56 39.56 | 2.1318 | 24 22 46.5 | 8.041 |
| 10 | 14 22 27.54 | 1.8883 | 16 24 6.0 | 11.960 | 10 | 15 58 47.64 | 2.1376 | 24 30 45.7 | 7.932 |
| 11 | 14 24 20.97 | 1.8926 | 16 36 1.8 | 11.900 | 11 | 16 0 56.06 | 2.1431 | 24 38 38.4 | 7.823 |
| 12 | 14 26 14.66 | 1.8970 | 16 47 54.0 | 11.838 | 12 | 16 3 4.81 | 2.1487 | 24 46 24.5 | 7.714 |
| 13 | 14 28 8.61 | 1.9014 | 16 59 42.4 | 11.775 | 13 | 16 5 13.89 | 2.1544 | 24 54 4.0 | 7.603 |
| 14 | 14 30 2.83 | 1.9058 | 17 11 27.0 | 11.711 | 14 | 16 7 23.32 | 2.1602 | 25 1 36.8 | 7.491 |
| 15 | 14 31 57.31 | 1.9101 | 17 23 7.7 | 11.645 | 15 | 16 9 33.11 | 2.1660 | 25 9 2.8 | 7.378 |
| 16 | 14 33 52.06 | 1.9148 | 17 34 44.5 | 11.579 | 16 | 16 11 43.24 | 2.1717 | 25 16 22.0 | 7.264 |
| 17 | 14 35 47.09 | 1.9193 | 17 46 17.3 | 11.513 | 17 | 16 13 53.71 | 2.1774 | 25 23 34.3 | 7.149 |
| 18 | 14 37 42.39 | 1.9239 | 17 57 46.2 | 11.446 | 18 | 16 16 4.52 | 2.1831 | 25 30 39.7 | 7.032 |
| 19 | 14 39 37.96 | 1.9286 | 18 9 11.0 | 11.378 | 19 | 16 18 15.66 | 2.1887 | 25 37 38.0 | 6.915 |
| 20 | 14 41 33.82 | 1.9334 | 18 20 31.6 | 11.309 | 20 | 16 20 27.14 | 2.1943 | 25 44 29.3 | 6.797 |
| 21 | 14 43 29.97 | 1.9383 | 18 31 48.0 | 11.238 | 21 | 16 22 38.96 | 2.1999 | 25 51 13.6 | 6.678 |
| 22 | 14 45 26.41 | 1.9431 | 18 43 0.1 | 11.166 | 22 | 16 24 51.12 | 2.2055 | 25 57 50.7 | 6.558 |
| 23 | 14 47 23.14 | 1.9479 | S.18 54 7.9 | 11.093 | 23 | 16 27 3.61 | 2.2110 | S.26 4 20.5 | 6.437 |
| | THURSDAY 2. | | | | | SATURDAY 4. | | | |
| 0 | 14 49 20.16 | 1.9528 | S.19 5 11.3 | 11.020 | 0 | 16 29 16.43 | 2.2165 | S.26 10 43.0 | 6.315 |
| 1 | 14 51 17.48 | 1.9577 | 19 16 10.3 | 10.947 | 1 | 16 31 29.57 | 2.2219 | 26 16 58.1 | 6.191 |
| 2 | 14 53 15.10 | 1.9626 | 19 27 4.9 | 10.873 | 2 | 16 33 43.04 | 2.2273 | 26 23 5.8 | 6.066 |
| 3 | 14 55 13.01 | 1.9676 | 19 37 54.9 | 10.797 | 3 | 16 35 56.84 | 2.2327 | 26 29 5.9 | 5.940 |
| 4 | 14 57 11.22 | 1.9727 | 19 48 40.3 | 10.720 | 4 | 16 38 10.97 | 2.2381 | 26 34 58.5 | 5.814 |
| 5 | 14 59 9.74 | 1.9779 | 19 59 21.1 | 10.642 | 5 | 16 40 25.42 | 2.2435 | 26 40 43.5 | 5.687 |
| 6 | 15 1 8.57 | 1.9831 | 20 9 57.2 | 10.562 | 6 | 16 42 40.19 | 2.2488 | 26 46 20.9 | 5.559 |
| 7 | 15 3 7.71 | 1.9883 | 20 20 28.4 | 10.481 | 7 | 16 44 55.27 | 2.2541 | 26 51 50.5 | 5.429 |
| 8 | 15 5 7.16 | 1.9935 | 20 30 54.8 | 10.400 | 8 | 16 47 10.67 | 2.2594 | 26 57 12.3 | 5.298 |
| 9 | 15 7 6.93 | 1.9987 | 20 41 16.3 | 10.318 | 9 | 16 49 26.39 | 2.2647 | 27 2 26.2 | 5.166 |
| 10 | 15 9 7.01 | 2.0039 | 20 51 32.9 | 10.235 | 10 | 16 51 42.42 | 2.2699 | 27 7 32.2 | 5.033 |
| 11 | 15 11 7.41 | 2.0092 | 21 1 44.5 | 10.151 | 11 | 16 53 58.76 | 2.2751 | 27 12 30.2 | 4.899 |
| 12 | 15 13 8.12 | 2.0145 | 21 11 51.0 | 10.065 | 12 | 16 56 15.42 | 2.2802 | 27 17 20.1 | 4.765 |
| 13 | 15 15 9.15 | 2.0199 | 21 21 52.4 | 9.978 | 13 | 16 58 32.38 | 2.2852 | 27 22 2.0 | 4.630 |
| 14 | 15 17 10.51 | 2.0253 | 21 31 48.5 | 9.891 | 14 | 17 0 49.64 | 2.2902 | 27 26 35.7 | 4.494 |
| 15 | 15 19 12.20 | 2.0308 | 21 41 39.3 | 9.803 | 15 | 17 3 7.19 | 2.2951 | 27 31 1.2 | 4.357 |
| 16 | 15 21 14.21 | 2.0363 | 21 51 24.9 | 9.715 | 16 | 17 5 25.04 | 2.2999 | 27 35 18.4 | 4.219 |
| 17 | 15 23 16.55 | 2.0417 | 22 1 5.1 | 9.626 | 17 | 17 7 43.18 | 2.3047 | 27 39 27.3 | 4.080 |
| 18 | 15 25 19.22 | 2.0472 | 22 10 39.9 | 9.535 | 18 | 17 10 1.60 | 2.3094 | 27 43 27.9 | 3.939 |
| 19 | 15 27 22.22 | 2.0527 | 22 20 9.2 | 9.442 | 19 | 17 12 20.30 | 2.3141 | 27 47 20.0 | 3.797 |
| 20 | 15 29 25.55 | 2.0582 | 22 29 32.9 | 9.349 | 20 | 17 14 39.28 | 2.3188 | 27 51 3.6 | 3.655 |
| 21 | 15 31 29.22 | 2.0638 | 22 38 51.0 | 9.253 | 21 | 17 16 58.54 | 2.3234 | 27 54 38.8 | 3.513 |
| 22 | 15 33 33.22 | 2.0694 | 22 48 3.5 | 9.159 | 22 | 17 19 18.08 | 2.3279 | 27 58 5.3 | 3.370 |
| 23 | 15 35 37.56 | 2.0750 | 22 57 10.1 | 9.063 | 23 | 17 21 37.88 | 2.3323 | 28 1 23.2 | 3.226 |
| 24 | 15 37 42.25 | 2.0806 | S.23 6 10.9 | 8.965 | 24 | 17 23 57.94 | 2.3366 | S.28 4 32.4 | 3.081 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 23 57.94 | 2.3366 | S.28 4 32.4 | 3.081 |
| 1 | 17 26 18.26 | 2.3409 | 28 7 32.9 | 2.935 |
| 2 | 17 28 38.82 | 2.3451 | 28 10 24.6 | 2.788 |
| 3 | 17 30 59.66 | 2.3492 | 28 13 7.4 | 2.641 |
| 4 | 17 33 20.74 | 2.3533 | 28 15 41.4 | 2.493 |
| 5 | 17 35 42.06 | 2.3573 | 28 18 6.5 | 2.343 |
| 6 | 17 38 3.62 | 2.3613 | 28 20 22.6 | 2.193 |
| 7 | 17 40 25.41 | 2.3652 | 28 22 29.6 | 2.042 |
| 8 | 17 42 47.43 | 2.3690 | 28 24 27.6 | 1.891 |
| 9 | 17 45 9.67 | 2.3726 | 28 26 16.5 | 1.739 |
| 10 | 17 47 32.13 | 2.3761 | 28 27 56.3 | 1.586 |
| 11 | 17 49 54.80 | 2.3795 | 28 29 26.8 | 1.431 |
| 12 | 17 52 17.67 | 2.3828 | 28 30 48.0 | 1.276 |
| 13 | 17 54 40.74 | 2.3861 | 28 31 59.9 | 1.121 |
| 14 | 17 57 4.01 | 2.3893 | 28 33 2.5 | 0.966 |
| 15 | 17 59 27.46 | 2.3925 | 28 33 55.8 | 0.812 |
| 16 | 18 1 51.10 | 2.3956 | 28 34 39.8 | 0.657 |
| 17 | 18 4 14.92 | 2.3986 | 28 35 14.4 | 0.499 |
| 18 | 18 6 38.92 | 2.4014 | 28 35 39.5 | 0.341 |
| 19 | 18 9 3.08 | 2.4041 | 28 35 55.1 | 0.182 |
| 20 | 18 11 27.41 | 2.4067 | 28 36 1.2 | 0.023 |
| 21 | 18 13 51.89 | 2.4092 | 28 35 57.8 | 0.137 |
| 22 | 18 16 16.52 | 2.4116 | 28 35 44.7 | 0.297 |
| 23 | 18 18 41.29 | 2.4139 | S.28 35 22.0 | 0.457 |

### MONDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 18 21 6.21 | 2.4161 | S.28 34 49.8 | 0.618 |
| 1 | 18 23 31.25 | 2.4183 | 28 34 7.8 | 0.780 |
| 2 | 18 25 56.41 | 2.4204 | 28 33 16.1 | 0.942 |
| 3 | 18 28 21.70 | 2.4224 | 28 32 14.6 | 1.104 |
| 4 | 18 30 47.10 | 2.4242 | 28 31 3.4 | 1.267 |
| 5 | 18 33 12.60 | 2.4259 | 28 29 42.4 | 1.431 |
| 6 | 18 35 38.20 | 2.4275 | 28 28 11.6 | 1.595 |
| 7 | 18 38 3.89 | 2.4289 | 28 26 31.0 | 1.759 |
| 8 | 18 40 29.67 | 2.4303 | 28 24 40.5 | 1.923 |
| 9 | 18 42 55.53 | 2.4316 | 28 22 40.1 | 2.087 |
| 10 | 18 45 21.47 | 2.4328 | 28 20 30.0 | 2.251 |
| 11 | 18 47 47.48 | 2.4340 | 28 18 10.0 | 2.416 |
| 12 | 18 50 13.56 | 2.4350 | 28 15 40.2 | 2.581 |
| 13 | 18 52 39.69 | 2.4359 | 28 13 0.4 | 2.746 |
| 14 | 18 55 5.87 | 2.4367 | 28 10 10.7 | 2.911 |
| 15 | 18 57 32.10 | 2.4374 | 28 7 11.1 | 3.076 |
| 16 | 18 59 58.37 | 2.4380 | 28 4 1.6 | 3.241 |
| 17 | 19 2 24.67 | 2.4385 | 28 0 42.2 | 3.406 |
| 18 | 19 4 50.99 | 2.4389 | 27 57 12.8 | 3.571 |
| 19 | 19 7 17.33 | 2.4392 | 27 53 33.5 | 3.736 |
| 20 | 19 9 43.68 | 2.4394 | 27 49 44.3 | 3.902 |
| 21 | 19 12 10.04 | 2.4396 | 27 45 45.1 | 4.069 |
| 22 | 19 14 36.41 | 2.4395 | 27 41 35.9 | 4.235 |
| 23 | 19 17 2.77 | 2.4393 | 27 37 16.8 | 4.400 |
| 24 | 19 19 29.12 | 2.4391 | S.27 32 47.8 | 4.568 |

### TUESDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 19 19 29.12 | 2.4391 | S.27 32 47.8 | 4.568 |
| 1 | 19 21 55.45 | 2.4388 | 27 28 8.8 | 4.732 |
| 2 | 19 24 21.76 | 2.4384 | 27 23 19.9 | 4.896 |
| 3 | 19 26 48.05 | 2.4379 | 27 18 21.2 | 5.061 |
| 4 | 19 29 14.30 | 2.4372 | 27 13 12.5 | 5.226 |
| 5 | 19 31 40.51 | 2.4364 | 27 7 53.9 | 5.393 |
| 6 | 19 34 6.67 | 2.4356 | 27 2 25.3 | 5.558 |
| 7 | 19 36 32.78 | 2.4346 | 26 56 46.9 | 5.722 |
| 8 | 19 38 58.84 | 2.4339 | 26 50 58.7 | 5.886 |
| 9 | 19 41 24.84 | 2.4329 | 26 45 0.7 | 6.049 |
| 10 | 19 43 50.78 | 2.4317 | 26 38 52.8 | 6.212 |
| 11 | 19 46 16.64 | 2.4304 | 26 32 35.2 | 6.375 |
| 12 | 19 48 42.43 | 2.4291 | 26 26 7.9 | 6.538 |
| 13 | 19 51 8.14 | 2.4278 | 26 19 30.9 | 6.701 |
| 14 | 19 53 33.76 | 2.4264 | 26 12 44.1 | 6.864 |
| 15 | 19 55 59.30 | 2.4249 | 26 5 47.4 | 7.026 |
| 16 | 19 58 24.75 | 2.4233 | 25 58 41.1 | 7.187 |
| 17 | 20 0 50.10 | 2.4216 | 25 51 25.1 | 7.347 |
| 18 | 20 3 15.34 | 2.4198 | 25 43 59.5 | 7.507 |
| 19 | 20 5 40.47 | 2.4179 | 25 36 24.3 | 7.667 |
| 20 | 20 8 5.49 | 2.4160 | 25 28 39.5 | 7.826 |
| 21 | 20 10 30.40 | 2.4140 | 25 20 45.1 | 7.984 |
| 22 | 20 12 55.18 | 2.4120 | 25 12 41.3 | 8.142 |
| 23 | 20 15 19.84 | 2.4099 | S.25 4 28.0 | 8.300 |

### WEDNESDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 20 17 44.37 | 2.4077 | S.24 56 5.1 | 8.458 |
| 1 | 20 20 8.77 | 2.4055 | 24 47 32.9 | 8.616 |
| 2 | 20 22 33.03 | 2.4033 | 24 38 51.3 | 8.773 |
| 3 | 20 24 57.16 | 2.4010 | 24 30 0.4 | 8.929 |
| 4 | 20 27 21.15 | 2.3987 | 24 21 0.2 | 9.084 |
| 5 | 20 29 44.99 | 2.3963 | 24 11 50.8 | 9.238 |
| 6 | 20 32 8.70 | 2.3939 | 24 2 32.1 | 9.391 |
| 7 | 20 34 32.26 | 2.3914 | 23 53 4.3 | 9.542 |
| 8 | 20 36 55.66 | 2.3888 | 23 43 27.4 | 9.692 |
| 9 | 20 39 18.90 | 2.3861 | 23 33 41.4 | 9.842 |
| 10 | 20 41 41.98 | 2.3834 | 23 23 46.3 | 9.992 |
| 11 | 20 44 4.91 | 2.3807 | 23 13 42.2 | 10.141 |
| 12 | 20 46 27.67 | 2.3780 | 23 3 29.3 | 10.290 |
| 13 | 20 48 50.28 | 2.3752 | 22 53 7.5 | 10.437 |
| 14 | 20 51 12.72 | 2.3724 | 22 42 36.9 | 10.584 |
| 15 | 20 53 34.98 | 2.3696 | 22 31 57.5 | 10.730 |
| 16 | 20 55 57.08 | 2.3668 | 22 21 9.4 | 10.874 |
| 17 | 20 58 19.01 | 2.3639 | 22 10 12.7 | 11.016 |
| 18 | 21 0 40.76 | 2.3611 | 21 59 7.5 | 11.158 |
| 19 | 21 3 2.34 | 2.3583 | 21 47 53.8 | 11.300 |
| 20 | 21 5 23.75 | 2.3554 | 21 36 31.6 | 11.442 |
| 21 | 21 7 44.99 | 2.3525 | 21 25 0.8 | 11.583 |
| 22 | 21 10 6.05 | 2.3496 | 21 13 21.7 | 11.721 |
| 23 | 21 12 26.93 | 2.3467 | 21 1 34.3 | 11.859 |
| 24 | 21 14 47.64 | 2.3437 | S.20 49 38.7 | 11.996 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 21 14 47.64 | 2.3437 | S.20 49 38.7 | 11.996 |
| 1 | 21 17 8.17 | 2.3407 | 20 37 34.9 | 12.131 |
| 2 | 21 19 28.52 | 2.3377 | 20 25 23.0 | 12.265 |
| 3 | 21 21 48.70 | 2.3348 | 20 13 3.1 | 12.398 |
| 4 | 21 24 8.70 | 2.3319 | 20 0 35.2 | 12.531 |
| 5 | 21 26 28.52 | 2.3289 | 19 47 59.3 | 12.663 |
| 6 | 21 28 48.16 | 2.3260 | 19 35 15.6 | 12.793 |
| 7 | 21 31 7.63 | 2.3230 | 19 22 24.1 | 12.922 |
| 8 | 21 33 26.92 | 2.3200 | 19 9 25.0 | 13.049 |
| 9 | 21 35 46.02 | 2.3170 | 18 56 18.3 | 13.176 |
| 10 | 21 38 4.95 | 2.3142 | 18 43 4.0 | 13.302 |
| 11 | 21 40 23.71 | 2.3112 | 18 29 42.2 | 13.426 |
| 12 | 21 42 42.29 | 2.3082 | 18 16 13.0 | 13.548 |
| 13 | 21 45 0.69 | 2.3053 | 18 2 36.6 | 13.668 |
| 14 | 21 47 18.92 | 2.3024 | 17 48 52.9 | 13.788 |
| 15 | 21 49 36.99 | 2.2996 | 17 35 2.0 | 13.907 |
| 16 | 21 51 54.88 | 2.2968 | 17 21 4.1 | 14.025 |
| 17 | 21 54 12.60 | 2.2939 | 17 6 59.2 | 14.141 |
| 18 | 21 56 30.15 | 2.2911 | 16 52 47.3 | 14.257 |
| 19 | 21 58 47.53 | 2.2883 | 16 38 28.5 | 14.371 |
| 20 | 22 1 4.75 | 2.2856 | 16 24 2.9 | 14.483 |
| 21 | 22 3 21.82 | 2.2830 | 16 9 30.6 | 14.592 |
| 22 | 22 5 38.72 | 2.2804 | 15 54 51.8 | 14.701 |
| 23 | 22 7 55.47 | 2.2778 | S.15 40 6.5 | 14.809 |

### FRIDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 22 10 12.06 | 2.2752 | S.15 25 14.7 | 14.917 |
| 1 | 22 12 28.50 | 2.2727 | 15 10 16.5 | 15.023 |
| 2 | 22 14 44.79 | 2.2702 | 14 55 12.0 | 15.126 |
| 3 | 22 17 0.93 | 2.2677 | 14 40 1.4 | 15.228 |
| 4 | 22 19 16.93 | 2.2653 | 14 24 44.7 | 15.329 |
| 5 | 22 21 32.78 | 2.2630 | 14 9 22.0 | 15.429 |
| 6 | 22 23 48.49 | 2.2607 | 13 53 53.4 | 15.527 |
| 7 | 22 26 4.07 | 2.2584 | 13 38 19.1 | 15.623 |
| 8 | 22 28 19.51 | 2.2562 | 13 22 39.1 | 15.718 |
| 9 | 22 30 34.81 | 2.2540 | 13 6 53.3 | 15.810 |
| 10 | 22 32 49.99 | 2.2519 | 12 51 2.1 | 15.901 |
| 11 | 22 35 5.04 | 2.2498 | 12 35 5.5 | 15.990 |
| 12 | 22 37 19.97 | 2.2478 | 12 19 3.5 | 16.078 |
| 13 | 22 39 34.78 | 2.2458 | 12 2 56.3 | 16.165 |
| 14 | 22 41 49.47 | 2.2439 | 11 46 43.8 | 16.250 |
| 15 | 22 44 4.04 | 2.2421 | 11 30 26.2 | 16.333 |
| 16 | 22 46 18.51 | 2.2403 | 11 14 3.8 | 16.414 |
| 17 | 22 48 32.88 | 2.2386 | 10 57 36.6 | 16.494 |
| 18 | 22 50 47.14 | 2.2369 | 10 41 4.6 | 16.572 |
| 19 | 22 53 1.30 | 2.2353 | 10 24 28.0 | 16.649 |
| 20 | 22 55 15.37 | 2.2338 | 10 7 46.8 | 16.726 |
| 21 | 22 57 29.35 | 2.2323 | 9 51 1.0 | 16.801 |
| 22 | 22 59 43.24 | 2.2309 | 9 34 10.8 | 16.872 |
| 23 | 23 1 57.05 | 2.2295 | 9 17 16.4 | 16.943 |
| 24 | 23 4 10.79 | 2.2282 | S. 9 0 17.8 | 17.012 |

### SATURDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 4 10.79 | 2.2282 | S. 9 0 17.8 | 17.012 |
| 1 | 23 6 24.45 | 2.2270 | 8 43 15.2 | 17.078 |
| 2 | 23 8 38.04 | 2.2259 | 8 26 8.6 | 17.142 |
| 3 | 23 10 51.56 | 2.2248 | 8 8 58.2 | 17.206 |
| 4 | 23 13 5.02 | 2.2238 | 7 51 44.1 | 17.266 |
| 5 | 23 15 18.42 | 2.2229 | 7 34 26.4 | 17.325 |
| 6 | 23 17 31.77 | 2.2220 | 7 17 5.2 | 17.381 |
| 7 | 23 19 45.07 | 2.2212 | 6 59 40.7 | 17.437 |
| 8 | 23 21 58.32 | 2.2205 | 6 42 12.9 | 17.492 |
| 9 | 23 24 11.53 | 2.2199 | 6 24 41.8 | 17.544 |
| 10 | 23 26 24.71 | 2.2194 | 6 7 7.7 | 17.594 |
| 11 | 23 28 37.86 | 2.2189 | 5 49 30.6 | 17.642 |
| 12 | 23 30 50.98 | 2.2185 | 5 31 50.7 | 17.688 |
| 13 | 23 33 4.07 | 2.2181 | 5 14 8.1 | 17.732 |
| 14 | 23 35 17.14 | 2.2178 | 4 56 22.9 | 17.775 |
| 15 | 23 37 30.20 | 2.2175 | 4 38 35.1 | 17.817 |
| 16 | 23 39 43.25 | 2.2173 | 4 20 45.0 | 17.855 |
| 17 | 23 41 56.30 | 2.2172 | 4 2 52.7 | 17.891 |
| 18 | 23 44 9.36 | 2.2173 | 3 44 58.2 | 17.925 |
| 19 | 23 46 22.42 | 2.2176 | 3 27 1.6 | 17.958 |
| 20 | 23 48 35.49 | 2.2179 | 3 9 3.0 | 17.990 |
| 21 | 23 50 48.57 | 2.2182 | 2 51 2.7 | 18.020 |
| 22 | 23 53 1.68 | 2.2186 | 2 33 0.7 | 18.047 |
| 23 | 23 55 14.81 | 2.2191 | S. 2 14 57.2 | 18.072 |

### SUNDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 23 57 27.97 | 2.2197 | S. 1 56 52.2 | 18.095 |
| 1 | 23 59 41.17 | 2.2203 | 1 38 45.9 | 18.117 |
| 2 | 0 1 54.41 | 2.2209 | 1 20 38.3 | 18.137 |
| 3 | 0 4 7.69 | 2.2216 | 1 2 29.6 | 18.157 |
| 4 | 0 6 21.02 | 2.2224 | 0 44 20.0 | 18.174 |
| 5 | 0 8 34.41 | 2.2234 | 0 26 9.6 | 18.182 |
| 6 | 0 10 47.85 | 2.2246 | S. 0 7 58.4 | 18.192 |
| 7 | 0 13 1.36 | 2.2258 | N. 0 10 13.4 | 18.201 |
| 8 | 0 15 14.94 | 2.2270 | 0 28 25.7 | 18.208 |
| 9 | 0 17 28.59 | 2.2283 | 0 46 38.3 | 18.213 |
| 10 | 0 19 42.33 | 2.2296 | 1 4 51.2 | 18.216 |
| 11 | 0 21 56.15 | 2.2310 | 1 23 4.1 | 18.216 |
| 12 | 0 24 10.05 | 2.2325 | 1 41 17.0 | 18.215 |
| 13 | 0 26 24.05 | 2.2341 | 1 59 29.8 | 18.212 |
| 14 | 0 28 38.15 | 2.2358 | 2 17 42.3 | 18.207 |
| 15 | 0 30 52.36 | 2.2376 | 2 35 54.4 | 18.199 |
| 16 | 0 33 6.68 | 2.2395 | 2 54 6.0 | 18.188 |
| 17 | 0 35 21.11 | 2.2414 | 3 12 16.9 | 18.176 |
| 18 | 0 37 35.65 | 2.2434 | 3 30 26.9 | 18.162 |
| 19 | 0 39 50.32 | 2.2456 | 3 48 35.9 | 18.145 |
| 20 | 0 42 5.12 | 2.2479 | 4 6 44.2 | 18.127 |
| 21 | 0 44 20.05 | 2.2502 | 4 24 51.1 | 18.108 |
| 22 | 0 46 35.13 | 2.2525 | 4 42 56.8 | 18.086 |
| 23 | 0 48 50.35 | 2.2549 | 5 1 1.0 | 18.059 |
| 24 | 0 51 5.71 | 2.2574 | N. 5 19 3.7 | 18.032 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 13. | | | | | WEDNESDAY 15. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 51 5.71 | 2.2574 | N. 5 19 3.7 | 18.032 | 0 | 2 43 35.28 | 2.4486 | N.18 32 3.6 | 14.191 |
| 1 | 0 53 21.23 | 2.2598 | 5 37 4.7 | 18.002 | 1 | 2 46 2.34 | 2.4534 | 18 46 11.1 | 14.062 |
| 2 | 0 55 36.90 | 2.2625 | 5 55 3.8 | 17.972 | 2 | 2 48 29.69 | 2.4582 | 19 0 10.8 | 13.930 |
| 3 | 0 57 52.73 | 2.2652 | 6 13 1.1 | 17.938 | 3 | 2 50 57.33 | 2.4631 | 19 14 2.5 | 13.795 |
| 4 | 1 0 8.73 | 2.2680 | 6 30 56.3 | 17.902 | 4 | 2 53 25.26 | 2.4680 | 19 27 46.0 | 13.658 |
| 5 | 1 2 24.90 | 2.2710 | 6 48 49.2 | 17.864 | 5 | 2 55 53.48 | 2.4728 | 19 41 21.3 | 13.519 |
| 6 | 1 4 41.25 | 2.2740 | 7 6 39.8 | 17.823 | 6 | 2 58 21.98 | 2.4775 | 19 54 48.3 | 13.379 |
| 7 | 1 6 57.78 | 2.2770 | 7 24 27.9 | 17.781 | 7 | 3 0 50.77 | 2.4822 | 20 8 6.8 | 13.238 |
| 8 | 1 9 14.49 | 2.2800 | 7 42 13.4 | 17.737 | 8 | 3 3 19.84 | 2.4869 | 20 21 16.8 | 13.095 |
| 9 | 1 11 31.38 | 2.2832 | 7 59 56.2 | 17.690 | 9 | 3 5 49.19 | 2.4916 | 20 34 18.1 | 12.949 |
| 10 | 1 13 48.47 | 2.2865 | 8 17 36.1 | 17.641 | 10 | 3 8 18.82 | 2.4963 | 20 47 10.6 | 12.801 |
| 11 | 1 16 5.76 | 2.2898 | 8 35 13.0 | 17.591 | 11 | 3 10 48.74 | 2.5010 | 20 59 54.2 | 12.653 |
| 12 | 1 18 23.24 | 2.2931 | 8 52 46.8 | 17.538 | 12 | 3 13 18.94 | 2.5056 | 21 12 28.9 | 12.504 |
| 13 | 1 20 40.92 | 2.2966 | 9 10 17.3 | 17.482 | 13 | 3 15 49.41 | 2.5102 | 21 24 54.6 | 12.353 |
| 14 | 1 22 58.82 | 2.3000 | 9 27 44.4 | 17.423 | 14 | 3 18 20.15 | 2.5146 | 21 37 11.1 | 12.200 |
| 15 | 1 25 16.93 | 2.3036 | 9 45 7.9 | 17.363 | 15 | 3 20 51.15 | 2.5190 | 21 49 18.4 | 12.044 |
| 16 | 1 27 35.26 | 2.3073 | 10 2 27.8 | 17.302 | 16 | 3 23 22.42 | 2.5234 | 22 1 16.3 | 11.887 |
| 17 | 1 29 53.81 | 2.3110 | 10 19 44.0 | 17.238 | 17 | 3 25 53.95 | 2.5277 | 22 13 4.7 | 11.728 |
| 18 | 1 32 12.58 | 2.3149 | 10 36 56.2 | 17.171 | 18 | 3 28 25.73 | 2.5319 | 22 24 43.5 | 11.568 |
| 19 | 1 34 31.59 | 2.3188 | 10 54 4.4 | 17.102 | 19 | 3 30 57.77 | 2.5361 | 22 36 12.8 | 11.407 |
| 20 | 1 36 50.83 | 2.3227 | 11 11 8.4 | 17.032 | 20 | 3 33 30.06 | 2.5403 | 22 47 32.3 | 11.245 |
| 21 | 1 39 10.30 | 2.3266 | 11 28 8.1 | 16.960 | 21 | 3 36 2.60 | 2.5446 | 22 58 42.1 | 11.080 |
| 22 | 1 41 30.01 | 2.3306 | 11 45 3.4 | 16.885 | 22 | 3 38 35.40 | 2.5488 | 23 9 41.9 | 10.913 |
| 23 | 1 43 49.97 | 2.3347 | N.12 1 54.1 | 16.807 | 23 | 3 41 8.45 | 2.5529 | N.23 20 31.7 | 10.747 |
| | TUESDAY 14. | | | | | THURSDAY 16. | | | |
| 0 | 1 46 10.17 | 2.3388 | N.12 18 40.1 | 16.727 | 0 | 3 43 41.74 | 2.5569 | N.23 31 11.5 | 10.580 |
| 1 | 1 48 30.62 | 2.3430 | 12 35 21.3 | 16.646 | 1 | 3 46 15.26 | 2.5605 | 23 41 41.2 | 10.410 |
| 2 | 1 50 51.33 | 2.3473 | 12 51 57.6 | 16.563 | 2 | 3 48 48.99 | 2.5641 | 23 52 0.7 | 10.238 |
| 3 | 1 53 12.30 | 2.3516 | 13 8 28.8 | 16.477 | 3 | 3 51 22.95 | 2.5677 | 24 2 9.8 | 10.067 |
| 4 | 1 55 33.52 | 2.3559 | 13 24 54.7 | 16.389 | 4 | 3 53 57.12 | 2.5718 | 24 12 8.6 | 9.894 |
| 5 | 1 57 55.00 | 2.3603 | 13 41 15.3 | 16.298 | 5 | 3 56 31.50 | 2.5749 | 24 21 57.0 | 9.719 |
| 6 | 2 0 16.75 | 2.3647 | 13 57 30.4 | 16.207 | 6 | 3 59 6.10 | 2.5784 | 24 31 34.9 | 9.545 |
| 7 | 2 2 38.76 | 2.3691 | 14 13 39.9 | 16.113 | 7 | 4 1 40.91 | 2.5817 | 24 41 2.3 | 9.369 |
| 8 | 2 5 1.04 | 2.3735 | 14 29 43.7 | 16.017 | 8 | 4 4 15.90 | 2.5848 | 24 50 19.1 | 9.192 |
| 9 | 2 7 23.58 | 2.3780 | 14 45 41.7 | 15.918 | 9 | 4 6 51.07 | 2.5879 | 24 59 25.2 | 9.012 |
| 10 | 2 9 46.39 | 2.3825 | 15 1 33.7 | 15.816 | 10 | 4 9 26.44 | 2.5910 | 25 8 20.5 | 8.832 |
| 11 | 2 12 9.48 | 2.3871 | 15 17 19.5 | 15.713 | 11 | 4 12 1.99 | 2.5940 | 25 17 5.0 | 8.651 |
| 12 | 2 14 32.85 | 2.3917 | 15 32 59.1 | 15.608 | 12 | 4 14 37.72 | 2.5968 | 25 25 38.6 | 8.470 |
| 13 | 2 16 56.49 | 2.3964 | 15 48 32.3 | 15.502 | 13 | 4 17 13.61 | 2.5996 | 25 34 1.3 | 8.288 |
| 14 | 2 19 20.41 | 2.4011 | 16 3 59.1 | 15.393 | 14 | 4 19 49.66 | 2.6022 | 25 42 13.0 | 8.104 |
| 15 | 2 21 44.62 | 2.4058 | 16 19 19.3 | 15.281 | 15 | 4 22 25.86 | 2.6046 | 25 50 13.6 | 7.919 |
| 16 | 2 24 9.11 | 2.4105 | 16 34 32.7 | 15.167 | 16 | 4 25 2.20 | 2.6068 | 25 58 3.1 | 7.733 |
| 17 | 2 26 33.88 | 2.4152 | 16 49 39.2 | 15.051 | 17 | 4 27 38.67 | 2.6090 | 26 5 41.5 | 7.547 |
| 18 | 2 28 58.93 | 2.4199 | 17 4 38.8 | 14.933 | 18 | 4 30 15.27 | 2.6111 | 26 13 8.8 | 7.360 |
| 19 | 2 31 24.27 | 2.4247 | 17 19 31.4 | 14.814 | 19 | 4 32 51.99 | 2.6130 | 26 20 24.9 | 7.173 |
| 20 | 2 33 49.90 | 2.4295 | 17 34 16.7 | 14.694 | 20 | 4 35 28.82 | 2.6149 | 26 27 29.7 | 6.986 |
| 21 | 2 36 15.81 | 2.4343 | 17 48 54.7 | 14.573 | 21 | 4 38 5.76 | 2.6166 | 26 34 23.4 | 6.799 |
| 22 | 2 38 42.01 | 2.4391 | 18 3 25.3 | 14.447 | 22 | 4 40 42.81 | 2.6182 | 26 41 5.7 | 6.611 |
| 23 | 2 41 8.50 | 2.4439 | 18 17 48.3 | 14.320 | 23 | 4 43 19.94 | 2.6196 | 26 47 36.6 | 6.422 |
| 24 | 2 43 35.28 | 2.4486 | N.18 32 3.6 | 14.191 | 24 | 4 45 57.15 | 2.6208 | N.26 53 56.2 | 6.232 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 17.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 4 45 57.15 | 2.6208 | N.26 53 56.2 | 6.232 |
| 1 | 4 48 34.43 | 2.6219 | 27 0 4.4 | 6.042 |
| 2 | 4 51 11.77 | 2.6229 | 27 6 1.1 | 5.851 |
| 3 | 4 53 49.17 | 2.6239 | 27 11 46.4 | 5.659 |
| 4 | 4 56 26.64 | 2.6248 | 27 17 20.2 | 5.467 |
| 5 | 4 59 4.14 | 2.6255 | 27 22 42.5 | 5.277 |
| 6 | 5 1 41.67 | 2.6260 | 27 27 53.4 | 5.086 |
| 7 | 5 4 19.22 | 2.6263 | 27 32 52.8 | 4.893 |
| 8 | 5 6 56.79 | 2.6262 | 27 37 40.6 | 4.700 |
| 9 | 5 9 34.35 | 2.6258 | 27 42 16.8 | 4.507 |
| 10 | 5 12 11.88 | 2.6253 | 27 46 41.4 | 4.315 |
| 11 | 5 14 49.38 | 2.6248 | 27 50 54.6 | 4.125 |
| 12 | 5 17 26.85 | 2.6243 | 27 54 56.4 | 3.935 |
| 13 | 5 20 4.28 | 2.6238 | 27 58 46.8 | 3.745 |
| 14 | 5 22 41.68 | 2.6232 | 28 2 25.5 | 3.545 |
| 15 | 5 25 19.05 | 2.6225 | 28 5 52.5 | 3.354 |
| 16 | 5 27 56.37 | 2.6215 | 28 9 7.9 | 3.163 |
| 17 | 5 30 33.63 | 2.6205 | 28 12 12.0 | 2.972 |
| 18 | 5 33 10.81 | 2.6188 | 28 15 4.7 | 2.781 |
| 19 | 5 35 47.88 | 2.6170 | 28 17 45.9 | 2.590 |
| 20 | 5 38 24.84 | 2.6151 | 28 20 15.6 | 2.400 |
| 21 | 5 41 1.69 | 2.6132 | 28 22 33.9 | 2.210 |
| 22 | 5 43 38.43 | 2.6112 | 28 24 40.8 | 2.020 |
| 23 | 5 46 15.05 | 2.6092 | N.28 26 36.4 | 1.831 |

### SATURDAY 18.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 5 48 51.51 | 2.6070 | N.28 28 20.6 | 1.642 |
| 1 | 5 51 27.85 | 2.6044 | 28 29 53.5 | 1.454 |
| 2 | 5 54 4.03 | 2.6016 | 28 31 15.1 | 1.266 |
| 3 | 5 56 40.04 | 2.5988 | 28 32 25.4 | 1.078 |
| 4 | 5 59 15.88 | 2.5958 | 28 33 24.5 | 0.890 |
| 5 | 6 1 51.53 | 2.5926 | 28 34 12.4 | 0.702 |
| 6 | 6 4 26.99 | 2.5894 | 28 34 49.0 | 0.516 |
| 7 | 6 7 2.25 | 2.5861 | 28 35 14.4 | 0.332 |
| 8 | 6 9 37.31 | 2.5827 | 28 35 28.8 | 0.148 |
| 9 | 6 12 12.16 | 2.5792 | 28 35 32.2 | 0.035 |
| 10 | 6 14 46.79 | 2.5753 | 28 35 24.6 | 0.218 |
| 11 | 6 17 21.18 | 2.5712 | 28 35 6.0 | 0.400 |
| 12 | 6 19 55.32 | 2.5670 | 28 34 36.4 | 0.582 |
| 13 | 6 22 29.20 | 2.5628 | 28 33 56.0 | 0.762 |
| 14 | 6 25 2.84 | 2.5585 | 28 33 4.9 | 0.942 |
| 15 | 6 27 36.21 | 2.5538 | 28 32 3.0 | 1.121 |
| 16 | 6 30 9.30 | 2.5492 | 28 30 50.5 | 1.297 |
| 17 | 6 32 42.11 | 2.5446 | 28 29 27.5 | 1.473 |
| 18 | 6 35 14.64 | 2.5399 | 28 27 53.9 | 1.647 |
| 19 | 6 37 46.89 | 2.5350 | 28 26 9.9 | 1.820 |
| 20 | 6 40 18.83 | 2.5298 | 28 24 15.5 | 1.993 |
| 21 | 6 42 50.45 | 2.5246 | 28 22 10.7 | 2.165 |
| 22 | 6 45 21.76 | 2.5191 | 28 19 55.7 | 2.335 |
| 23 | 6 47 52.75 | 2.5137 | 28 17 30.5 | 2.505 |
| 24 | 6 50 23.41 | 2.5068 | N.28 14 55.1 | 2.674 |

### SUNDAY 19.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 6 50 23.41 | 2.5068 | N.28 14 55.1 | 2.674 |
| 1 | 6 52 53.74 | 2.5028 | 28 12 9.7 | 2.842 |
| 2 | 6 55 23.73 | 2.4972 | 28 9 14.4 | 3.007 |
| 3 | 6 57 53.37 | 2.4912 | 28 6 9.2 | 3.171 |
| 4 | 7 0 22.66 | 2.4852 | 28 2 54.1 | 3.333 |
| 5 | 7 2 51.59 | 2.4792 | 27 59 29.3 | 3.496 |
| 6 | 7 5 20.16 | 2.4731 | 27 55 54.8 | 3.656 |
| 7 | 7 7 48.36 | 2.4670 | 27 52 10.7 | 3.816 |
| 8 | 7 10 16.19 | 2.4606 | 27 48 17.0 | 3.976 |
| 9 | 7 12 43.63 | 2.4541 | 27 44 13.8 | 4.129 |
| 10 | 7 15 10.68 | 2.4477 | 27 40 1.3 | 4.288 |
| 11 | 7 17 37.34 | 2.4412 | 27 35 39.3 | 4.446 |
| 12 | 7 20 3.60 | 2.4345 | 27 31 7.9 | 4.600 |
| 13 | 7 22 29.46 | 2.4278 | 27 26 27.4 | 4.756 |
| 14 | 7 24 54.92 | 2.4210 | 27 21 37.7 | 4.908 |
| 15 | 7 27 19.97 | 2.4142 | 27 16 39.0 | 5.058 |
| 16 | 7 29 44.61 | 2.4072 | 27 11 31.5 | 5.206 |
| 17 | 7 32 8.83 | 2.4002 | 27 6 15.1 | 5.348 |
| 18 | 7 34 32.63 | 2.3933 | 27 0 49.9 | 5.493 |
| 19 | 7 36 56.02 | 2.3864 | 26 55 16.0 | 5.638 |
| 20 | 7 39 18.99 | 2.3793 | 26 49 33.5 | 5.781 |
| 21 | 7 41 41.53 | 2.3722 | 26 43 42.5 | 5.921 |
| 22 | 7 44 3.63 | 2.3651 | 26 37 43.2 | 6.061 |
| 23 | 7 46 25.31 | 2.3580 | N.26 31 35.5 | 6.201 |

### MONDAY 20.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 48 46.59 | 2.3508 | N.26 25 19.4 | 6.336 |
| 1 | 7 51 7.42 | 2.3436 | 26 18 55.3 | 6.471 |
| 2 | 7 53 27.81 | 2.3363 | 26 12 23.1 | 6.605 |
| 3 | 7 55 47.75 | 2.3290 | 26 5 42.8 | 6.738 |
| 4 | 7 58 7.26 | 2.3216 | 25 58 54.6 | 6.870 |
| 5 | 8 0 26.33 | 2.3142 | 25 51 58.6 | 7.000 |
| 6 | 8 2 44.95 | 2.3067 | 25 44 54.8 | 7.127 |
| 7 | 8 5 3.13 | 2.2993 | 25 37 43.4 | 7.254 |
| 8 | 8 7 20.87 | 2.2920 | 25 30 24.4 | 7.379 |
| 9 | 8 9 38.17 | 2.2847 | 25 22 57.8 | 7.503 |
| 10 | 8 11 55.03 | 2.2773 | 25 15 23.9 | 7.626 |
| 11 | 8 14 11.44 | 2.2697 | 25 7 42.7 | 7.746 |
| 12 | 8 16 27.40 | 2.2623 | 24 59 54.2 | 7.866 |
| 13 | 8 18 42.92 | 2.2550 | 24 51 58.6 | 7.987 |
| 14 | 8 20 58.00 | 2.2476 | 24 43 55.9 | 8.105 |
| 15 | 8 23 12.63 | 2.2401 | 24 35 46.2 | 8.219 |
| 16 | 8 25 26.81 | 2.2327 | 24 27 29.7 | 8.333 |
| 17 | 8 27 40.55 | 2.2253 | 24 19 6.3 | 8.446 |
| 18 | 8 29 53.85 | 2.2177 | 24 10 36.1 | 8.559 |
| 19 | 8 32 6.69 | 2.2103 | 24 1 59.2 | 8.669 |
| 20 | 8 34 19.09 | 2.2030 | 23 53 15.8 | 8.778 |
| 21 | 8 36 31.05 | 2.1957 | 23 44 25.9 | 8.886 |
| 22 | 8 38 42.57 | 2.1883 | 23 35 29.6 | 8.992 |
| 23 | 8 40 53.65 | 2.1811 | 23 26 27.0 | 9.096 |
| 24 | 8 43 4.30 | 2.1739 | N.23 17 18.2 | 9.199 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | TUESDAY 21. | | | | | THURSDAY 23. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 43 4.30 | 2.1739 | N.23 17 18.2 | 9.199 | 0 | 10 19 50.07 | 1.8794 | N.14 20 20.7 | 12.738 |
| 1 | 8 45 14.52 | 2.1667 | 23 8 3.2 | 9.302 | 1 | 10 21 42.70 | 1.8749 | 14 7 35.0 | 12.786 |
| 2 | 8 47 24.30 | 2.1595 | 22 58 42.1 | 9.403 | 2 | 10 23 35.06 | 1.8704 | 13 54 46.5 | 12.834 |
| 3 | 8 49 33.65 | 2.1521 | 22 49 15.0 | 9.502 | 3 | 10 25 27.15 | 1.8659 | 13 41 55.1 | 12.880 |
| 4 | 8 51 42.55 | 2.1448 | 22 39 42.0 | 9.599 | 4 | 10 27 18.97 | 1.8614 | 13 29 1.0 | 12.924 |
| 5 | 8 53 51.03 | 2.1377 | 22 30 3.2 | 9.696 | 5 | 10 29 10.53 | 1.8572 | 13 16 4.3 | 12.967 |
| 6 | 8 55 59.10 | 2.1307 | 22 20 18.6 | 9.792 | 6 | 10 31 1.84 | 1.8530 | 13 3 5.1 | 13.009 |
| 7 | 8 58 6.73 | 2.1237 | 22 10 28.3 | 9.887 | 7 | 10 32 52.91 | 1.8488 | 12 50 3.3 | 13.052 |
| 8 | 9 0 13.94 | 2.1165 | 22 0 32.3 | 9.979 | 8 | 10 34 43.71 | 1.8446 | 12 36 59.0 | 13.094 |
| 9 | 9 2 20.72 | 2.1094 | 21 50 30.8 | 10.071 | 9 | 10 36 34.25 | 1.8406 | 12 23 52.1 | 13.134 |
| 10 | 9 4 27.08 | 2.1024 | 21 40 23.8 | 10.162 | 10 | 10 38 24.57 | 1.8366 | 12 10 42.9 | 13.174 |
| 11 | 9 6 33.03 | 2.0956 | 21 30 11.5 | 10.250 | 11 | 10 40 14.66 | 1.8327 | 11 57 31.4 | 13.212 |
| 12 | 9 8 38.58 | 2.0888 | 21 19 54.0 | 10.338 | 12 | 10 42 4.51 | 1.8290 | 11 44 17.6 | 13.248 |
| 13 | 9 10 43.71 | 2.0823 | 21 9 31.2 | 10.424 | 13 | 10 43 54.14 | 1.8253 | 11 31 1.6 | 13.284 |
| 14 | 9 12 48.43 | 2.0756 | 20 59 3.3 | 10.510 | 14 | 10 45 43.55 | 1.8216 | 11 17 43.4 | 13.322 |
| 15 | 9 14 52.75 | 2.0690 | 20 48 30.2 | 10.594 | 15 | 10 47 32.74 | 1.8181 | 11 4 22.9 | 13.356 |
| 16 | 9 16 56.67 | 2.0622 | 20 37 52.1 | 10.677 | 16 | 10 49 21.72 | 1.8146 | 10 51 0.4 | 13.393 |
| 17 | 9 19 0.19 | 2.0553 | 20 27 9.1 | 10.758 | 17 | 10 51 10.49 | 1.8110 | 10 37 35.9 | 13.427 |
| 18 | 9 21 3.31 | 2.0486 | 20 16 21.3 | 10.839 | 18 | 10 52 59.05 | 1.8075 | 10 24 9.3 | 13.459 |
| 19 | 9 23 6.03 | 2.0421 | 20 5 28.6 | 10.918 | 19 | 10 54 47.41 | 1.8043 | 10 10 40.8 | 13.492 |
| 20 | 9 25 8.37 | 2.0357 | 19 54 31.2 | 10.996 | 20 | 10 56 35.59 | 1.8011 | 9 57 10.4 | 13.524 |
| 21 | 9 27 10.32 | 2.0293 | 19 43 29.2 | 11.072 | 21 | 10 58 23.57 | 1.7980 | 9 43 38.2 | 13.554 |
| 22 | 9 29 11.89 | 2.0229 | 19 32 22.6 | 11.149 | 22 | 11 0 11.36 | 1.7950 | 9 30 4.1 | 13.583 |
| 23 | 9 31 13.07 | 2.0166 | N.19 21 11.4 | 11.224 | 23 | 11 1 58.97 | 1.7919 | N. 9 16 28.3 | 13.612 |
| | WEDNESDAY 22. | | | | | FRIDAY 24. | | | |
| 0 | 9 33 13.89 | 2.0104 | N.19 9 55.8 | 11.298 | 0 | 11 3 46.40 | 1.7891 | N. 9 2 50.9 | 13.640 |
| 1 | 9 35 14.33 | 2.0042 | 18 58 35.8 | 11.369 | 1 | 11 5 33.66 | 1.7863 | 8 49 12.3 | 13.667 |
| 2 | 9 37 14.40 | 1.9980 | 18 47 11.6 | 11.440 | 2 | 11 7 20.76 | 1.7835 | 8 35 30.7 | 13.692 |
| 3 | 9 39 14.09 | 1.9920 | 18 35 43.1 | 11.510 | 3 | 11 9 7.68 | 1.7807 | 8 21 48.6 | 13.718 |
| 4 | 9 41 13.43 | 1.9860 | 18 24 10.4 | 11.579 | 4 | 11 10 54.44 | 1.7779 | 8 8 4.8 | 13.744 |
| 5 | 9 43 12.41 | 1.9800 | 18 12 33.7 | 11.646 | 5 | 11 12 41.04 | 1.7753 | 7 54 19.5 | 13.769 |
| 6 | 9 45 11.03 | 1.9742 | 18 0 53.1 | 11.713 | 6 | 11 14 27.48 | 1.7728 | 7 40 32.7 | 13.791 |
| 7 | 9 47 9.31 | 1.9684 | 17 49 8.4 | 11.778 | 7 | 11 16 13.78 | 1.7704 | 7 26 44.6 | 13.813 |
| 8 | 9 49 7.24 | 1.9628 | 17 37 19.8 | 11.842 | 8 | 11 17 59.94 | 1.7681 | 7 12 55.2 | 13.835 |
| 9 | 9 51 4.82 | 1.9572 | 17 25 27.4 | 11.905 | 9 | 11 19 45.97 | 1.7659 | 6 59 4.5 | 13.855 |
| 10 | 9 53 2.07 | 1.9513 | 17 13 31.1 | 11.968 | 10 | 11 21 31.86 | 1.7637 | 6 45 12.6 | 13.875 |
| 11 | 9 54 58.98 | 1.9455 | 17 1 31.1 | 12.030 | 11 | 11 23 17.62 | 1.7617 | 6 31 19.5 | 13.896 |
| 12 | 9 56 55.55 | 1.9402 | 16 49 27.5 | 12.092 | 12 | 11 25 3.26 | 1.7597 | 6 17 25.2 | 13.915 |
| 13 | 9 58 51.80 | 1.9348 | 16 37 20.2 | 12.153 | 13 | 11 26 48.78 | 1.7577 | 6 3 29.8 | 13.934 |
| 14 | 10 0 47.73 | 1.9294 | 16 25 9.3 | 12.211 | 14 | 11 28 34.18 | 1.7556 | 5 49 33.4 | 13.951 |
| 15 | 10 2 43.33 | 1.9241 | 16 12 55.0 | 12.268 | 15 | 11 30 19.46 | 1.7536 | 5 35 35.9 | 13.967 |
| 16 | 10 4 38.62 | 1.9189 | 16 0 37.3 | 12.323 | 16 | 11 32 4.63 | 1.7519 | 5 21 37.5 | 13.982 |
| 17 | 10 6 33.60 | 1.9137 | 15 48 16.3 | 12.377 | 17 | 11 33 49.70 | 1.7503 | 5 7 38.2 | 13.998 |
| 18 | 10 8 28.27 | 1.9086 | 15 35 52.1 | 12.431 | 18 | 11 35 34.68 | 1.7488 | 4 53 37.9 | 14.012 |
| 19 | 10 10 22.64 | 1.9035 | 15 23 24.7 | 12.485 | 19 | 11 37 19.56 | 1.7472 | 4 39 36.8 | 14.026 |
| 20 | 10 12 16.71 | 1.8985 | 15 10 54.1 | 12.538 | 20 | 11 39 4.35 | 1.7457 | 4 25 34.9 | 14.038 |
| 21 | 10 14 10.48 | 1.8939 | 14 58 20.3 | 12.590 | 21 | 11 40 49.05 | 1.7443 | 4 11 32.3 | 14.050 |
| 22 | 10 16 3.97 | 1.8893 | 14 45 43.4 | 12.641 | 22 | 11 42 33.67 | 1.7429 | 3 57 29.0 | 14.061 |
| 23 | 10 17 57.17 | 1.8843 | 14 33 3.5 | 12.690 | 23 | 11 44 18.21 | 1.7417 | 3 43 25.0 | 14.072 |
| 24 | 10 19 50.07 | 1.8794 | N.14 20 20.7 | 12.738 | 24 | 11 46 2.68 | 1.7405 | N. 3 29 20.4 | 14.082 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| SATURDAY 25. | | | | | MONDAY 27. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 11 46 2.68 | 1.7405 | N. 3 29 20.4 | 14.082 | 0 | 13 9 32.81 | 1.7649 | S. 7 44 18.8 | 13.707 |
| 1 | 11 47 47.08 | 1.7394 | 3 15 15.2 | 14.091 | 1 | 13 11 18.77 | 1.7671 | 7 58 0.4 | 13.681 |
| 2 | 11 49 31.42 | 1.7384 | 3 1 9.5 | 14.100 | 2 | 13 13 4.86 | 1.7693 | 8 11 40.4 | 13.652 |
| 3 | 11 51 15.69 | 1.7374 | 2 47 3.3 | 14.107 | 3 | 13 14 51.08 | 1.7716 | 8 25 18.7 | 13.624 |
| 4 | 11 52 59.91 | 1.7365 | 2 32 56.7 | 14.114 | 4 | 13 16 37.45 | 1.7740 | 8 38 55.3 | 13.596 |
| 5 | 11 54 44.08 | 1.7356 | 2 18 49.7 | 14.120 | 5 | 13 18 23.96 | 1.7764 | 8 52 30.2 | 13.567 |
| 6 | 11 56 28.20 | 1.7348 | 2 4 42.2 | 14.126 | 6 | 13 20 10.61 | 1.7789 | 9 6 3.3 | 13.538 |
| 7 | 11 58 12.27 | 1.7341 | 1 50 34.5 | 14.132 | 7 | 13 21 57.42 | 1.7814 | 9 19 34.6 | 13.507 |
| 8 | 11 59 56.30 | 1.7336 | 1 36 26.5 | 14.135 | 8 | 13 23 44.38 | 1.7838 | 9 33 4.0 | 13.474 |
| 9 | 12 1 40.30 | 1.7331 | 1 22 18.3 | 14.138 | 9 | 13 25 31.49 | 1.7864 | 9 46 31.4 | 13.440 |
| 10 | 12 3 24.27 | 1.7326 | 1 8 9.9 | 14.141 | 10 | 13 27 18.76 | 1.7892 | 9 59 56.8 | 13.407 |
| 11 | 12 5 8.21 | 1.7320 | 0 54 1.3 | 14.144 | 11 | 13 29 6.20 | 1.7920 | 10 13 20.2 | 13.375 |
| 12 | 12 6 52.12 | 1.7316 | 0 39 52.6 | 14.145 | 12 | 13 30 53.81 | 1.7949 | 10 26 41.6 | 13.340 |
| 13 | 12 8 36.01 | 1.7313 | 0 25 43.9 | 14.145 | 13 | 13 32 41.59 | 1.7978 | 10 40 0.8 | 13.302 |
| 14 | 12 10 19.89 | 1.7313 | N. 0 11 35.2 | 14.145 | 14 | 13 34 29.55 | 1.8008 | 10 53 17.8 | 13.265 |
| 15 | 12 12 3.77 | 1.7312 | S. 0 2 33.5 | 14.145 | 15 | 13 36 17.69 | 1.8038 | 11 6 32.6 | 13.228 |
| 16 | 12 13 47.64 | 1.7312 | 0 16 42.2 | 14.143 | 16 | 13 38 6.01 | 1.8068 | 11 19 45.1 | 13.190 |
| 17 | 12 15 31.51 | 1.7311 | 0 30 50.7 | 14.140 | 17 | 13 39 54.52 | 1.8099 | 11 32 55.3 | 13.151 |
| 18 | 12 17 15.37 | 1.7311 | 0 44 59.0 | 14.136 | 18 | 13 41 43.21 | 1.8132 | 11 46 3.1 | 13.111 |
| 19 | 12 18 59.24 | 1.7312 | 0 59 7.0 | 14.132 | 19 | 13 43 32.10 | 1.8165 | 11 59 8.5 | 13.070 |
| 20 | 12 20 43.12 | 1.7315 | 1 3 14.8 | 14.129 | 20 | 13 45 21.19 | 1.8198 | 12 12 11.4 | 13.027 |
| 21 | 12 22 27.02 | 1.7318 | 1 27 22.4 | 14.125 | 21 | 13 47 10.47 | 1.8232 | 12 25 11.7 | 12.983 |
| 22 | 12 24 10.94 | 1.7321 | 1 41 29.7 | 14.119 | 22 | 13 48 59.96 | 1.8266 | 12 38 9.4 | 12.940 |
| 23 | 12 25 54.88 | 1.7326 | S. 1 55 36.6 | 14.112 | 23 | 13 50 49.66 | 1.8301 | S. 12 51 4.5 | 12.896 |
| SUNDAY 26. | | | | | TUESDAY 28. | | | | |
| 0 | 12 27 38.85 | 1.7330 | S. 2 9 43.1 | 14.106 | 0 | 13 52 39.57 | 1.8339 | S. 13 3 56.9 | 12.852 |
| 1 | 12 29 22.85 | 1.7335 | 2 23 49.2 | 14.098 | 1 | 13 54 29.71 | 1.8374 | 13 16 46.6 | 12.806 |
| 2 | 12 31 6.89 | 1.7341 | 2 37 54.8 | 14.088 | 2 | 13 56 20.06 | 1.8408 | 13 29 33.5 | 12.758 |
| 3 | 12 32 50.96 | 1.7349 | 2 51 59.8 | 14.078 | 3 | 13 58 10.62 | 1.8446 | 13 42 17.5 | 12.709 |
| 4 | 12 34 35.08 | 1.7357 | 3 6 4.2 | 14.068 | 4 | 14 0 1.41 | 1.8484 | 13 54 58.5 | 12.660 |
| 5 | 12 36 19.25 | 1.7365 | 3 20 8.0 | 14.056 | 5 | 14 1 52.43 | 1.8522 | 14 7 36.6 | 12.611 |
| 6 | 12 38 3.46 | 1.7373 | 3 34 11.1 | 14.045 | 6 | 14 3 43.68 | 1.8560 | 14 20 11.7 | 12.560 |
| 7 | 12 39 47.73 | 1.7382 | 3 48 13.4 | 14.033 | 7 | 14 5 35.16 | 1.8600 | 14 32 43.7 | 12.507 |
| 8 | 12 41 32.06 | 1.7394 | 4 2 15.0 | 14.021 | 8 | 14 7 26.88 | 1.8640 | 14 45 12.5 | 12.453 |
| 9 | 12 43 16.46 | 1.7406 | 4 16 15.8 | 14.006 | 9 | 14 9 18.84 | 1.8680 | 14 57 38.1 | 12.401 |
| 10 | 12 45 0.93 | 1.7418 | 4 30 15.7 | 13.991 | 10 | 14 11 11.04 | 1.8721 | 15 10 0.5 | 12.347 |
| 11 | 12 46 45.47 | 1.7428 | 4 44 14.7 | 13.975 | 11 | 14 13 3.49 | 1.8763 | 15 22 19.6 | 12.290 |
| 12 | 12 48 30.08 | 1.7443 | 4 58 12.8 | 13.958 | 12 | 14 14 56.18 | 1.8803 | 15 34 35.3 | 12.233 |
| 13 | 12 50 14.78 | 1.7457 | 5 12 9.8 | 13.942 | 13 | 14 16 49.13 | 1.8847 | 15 46 47.6 | 12.177 |
| 14 | 12 51 59.56 | 1.7471 | 5 26 5.8 | 13.926 | 14 | 14 18 42.34 | 1.8891 | 15 58 56.5 | 12.120 |
| 15 | 12 53 44.42 | 1.7486 | 5 40 0.8 | 13.908 | 15 | 14 20 35.81 | 1.8930 | 16 11 1.9 | 12.061 |
| 16 | 12 55 29.38 | 1.7500 | 5 53 54.7 | 13.888 | 16 | 14 22 29.53 | 1.8978 | 16 23 3.6 | 11.999 |
| 17 | 12 57 14.43 | 1.7516 | 6 7 47.3 | 13.868 | 17 | 14 24 23.53 | 1.9023 | 16 35 1.7 | 11.938 |
| 18 | 12 58 59.58 | 1.7533 | 6 21 38.7 | 13.847 | 18 | 14 26 17.82 | 1.9068 | 16 46 56.1 | 11.876 |
| 19 | 13 0 44.84 | 1.7550 | 6 35 28.8 | 13.825 | 19 | 14 28 12.34 | 1.9113 | 16 58 46.8 | 11.813 |
| 20 | 13 2 30.21 | 1.7568 | 6 49 17.6 | 13.802 | 20 | 14 30 7.15 | 1.9158 | 17 10 33.6 | 11.750 |
| 21 | 13 4 15.68 | 1.7588 | 7 3 5.0 | 13.778 | 21 | 14 32 2.22 | 1.9205 | 17 22 16.6 | 11.683 |
| 22 | 13 6 1.27 | 1.7608 | 7 16 51.0 | 13.755 | 22 | 14 33 57.59 | 1.9252 | 17 33 55.6 | 11.616 |
| 23 | 13 7 46.98 | 1.7628 | 7 30 35.6 | 13.731 | 23 | 14 35 53.24 | 1.9298 | 17 45 30.6 | 11.550 |
| 24 | 13 9 32.81 | 1.7649 | S. 7 44 18.8 | 13.707 | 24 | 14 37 49.16 | 1.9344 | S. 17 57 1.7 | 11.483 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### WEDNESDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 37 49.16 | 1.9344 | S.17 57 1.7 | 11.483 |
| 1 | 14 39 45.37 | 1.9392 | 18 8 28.6 | 11.414 |
| 2 | 14 41 41.87 | 1.9440 | 18 19 51.3 | 11.344 |
| 3 | 14 43 38.67 | 1.9488 | 18 31 9.8 | 11.273 |
| 4 | 14 45 35.75 | 1.9538 | 18 42 24.0 | 11.201 |
| 5 | 14 47 33.13 | 1.9588 | 18 53 33.8 | 11.129 |
| 6 | 14 49 30.81 | 1.9638 | 19 4 39.3 | 11.056 |
| 7 | 14 51 28.79 | 1.9688 | 19 15 40.3 | 10.978 |
| 8 | 14 53 27.07 | 1.9738 | 19 26 36.7 | 10.902 |
| 9 | 14 55 25.67 | 1.9789 | 19 37 28.5 | 10.824 |
| 10 | 14 57 24.56 | 1.9840 | 19 48 15.6 | 10.746 |
| 11 | 14 59 23.76 | 1.9891 | 19 58 58.0 | 10.668 |
| 12 | 15 1 23.28 | 1.9943 | 20 9 35.6 | 10.588 |
| 13 | 15 3 23.10 | 1.9997 | 20 20 8.3 | 10.507 |
| 14 | 15 5 23.24 | 2.0051 | 20 30 36.2 | 10.424 |
| 15 | 15 7 23.70 | 2.0102 | 20 40 59.1 | 10.341 |
| 16 | 15 9 24.47 | 2.0155 | 20 51 17.0 | 10.256 |
| 17 | 15 11 25.56 | 2.0208 | 21 1 29.8 | 10.172 |
| 18 | 15 13 26.97 | 2.0261 | 21 11 37.5 | 10.086 |
| 19 | 15 15 28.70 | 2.0315 | 21 21 40.0 | 10.000 |
| 20 | 15 17 30.75 | 2.0368 | 21 31 37.3 | 9.912 |
| 21 | 15 19 33.12 | 2.0423 | 21 41 29.2 | 9.819 |
| 22 | 15 21 35.82 | 2.0478 | 21 51 15.5 | 9.726 |
| 23 | 15 23 38.85 | 2.0532 | S.22 0 56.3 | 9.634 |

#### THURSDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 25 42.20 | 2.0585 | S.22 10 31.6 | 9.542 |
| 1 | 15 27 45.87 | 2.0639 | 22 20 1.3 | 9.448 |
| 2 | 15 29 49.87 | 2.0694 | 22 29 25.3 | 9.353 |
| 3 | 15 31 54.20 | 2.0749 | 22 38 43.6 | 9.256 |
| 4 | 15 33 58.86 | 2.0804 | 22 47 56.1 | 9.159 |
| 5 | 15 36 3.86 | 2.0860 | 22 57 2.7 | 9.061 |
| 6 | 15 38 9.19 | 2.0914 | 23 6 3.4 | 8.963 |
| 7 | 15 40 14.84 | 2.0970 | 23 14 58.2 | 8.863 |
| 8 | 15 42 20.82 | 2.1026 | 23 23 46.9 | 8.761 |
| 9 | 15 44 27.14 | 2.1082 | 23 32 29.4 | 8.659 |
| 10 | 15 46 33.79 | 2.1137 | 23 41 5.8 | 8.554 |
| 11 | 15 48 40.77 | 2.1190 | 23 49 35.9 | 8.449 |
| 12 | 15 50 48.07 | 2.1245 | 23 57 59.7 | 8.344 |
| 13 | 15 52 55.69 | 2.1301 | 24 6 17.2 | 8.238 |
| 14 | 15 55 3.65 | 2.1355 | 24 14 28.2 | 8.129 |
| 15 | 15 57 11.94 | 2.1409 | 24 22 32.6 | 8.020 |
| 16 | 15 59 20.56 | 2.1464 | 24 30 30.5 | 7.911 |
| 17 | 16 1 29.51 | 2.1519 | 24 38 21.8 | 7.800 |
| 18 | 16 3 38.79 | 2.1574 | 24 46 6.5 | 7.688 |
| 19 | 16 5 48.40 | 2.1628 | 24 53 44.4 | 7.576 |
| 20 | 16 7 58.33 | 2.1682 | 25 1 15.5 | 7.463 |
| 21 | 16 10 8.58 | 2.1736 | 25 8 39.8 | 7.347 |
| 22 | 16 12 19.15 | 2.1790 | 25 15 57.1 | 7.231 |
| 23 | 16 14 30.05 | 2.1843 | 25 23 7.4 | 7.118 |
| 24 | 16 16 41.27 | 2.1896 | S.25 30 10.6 | 6.996 |

#### FRIDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 16 41.27 | 2.1896 | S.25 30 10.6 | 6.996 |
| 1 | 16 18 52.81 | 2.1948 | 25 37 6.7 | 6.876 |
| 2 | 16 21 4.66 | 2.2001 | 25 43 55.6 | 6.756 |
| 3 | 16 23 16.83 | 2.2054 | 25 50 37.3 | 6.633 |
| 4 | 16 25 29.31 | 2.2106 | 25 57 11.6 | 6.510 |
| 5 | 16 27 42.10 | 2.2158 | 26 3 38.5 | 6.387 |
| 6 | 16 29 55.20 | 2.2210 | 26 9 58.0 | 6.264 |
| 7 | 16 32 8.61 | 2.2261 | 26 16 10.1 | 6.139 |
| 8 | 16 34 22.32 | 2.2311 | 26 22 14.7 | 6.012 |
| 9 | 16 36 36.33 | 2.2362 | 26 28 11.6 | 5.884 |
| 10 | 16 38 50.65 | 2.2412 | 26 34 0.8 | 5.756 |
| 11 | 16 41 5.27 | 2.2462 | 26 39 42.3 | 5.627 |
| 12 | 16 43 20.18 | 2.2510 | 26 45 16.1 | 5.497 |
| 13 | 16 45 35.37 | 2.2557 | 26 50 42.0 | 5.367 |
| 14 | 16 47 50.85 | 2.2603 | 26 56 0.1 | 5.236 |
| 15 | 16 50 6.61 | 2.2650 | 27 1 10.3 | 5.104 |
| 16 | 16 52 22.65 | 2.2697 | 27 6 12.5 | 4.970 |
| 17 | 16 54 38.97 | 2.2744 | 27 11 6.6 | 4.834 |
| 18 | 16 56 55.57 | 2.2790 | 27 15 52.5 | 4.698 |
| 19 | 16 59 12.44 | 2.2833 | 27 20 30.3 | 4.562 |
| 20 | 17 1 29.57 | 2.2877 | 27 24 59.9 | 4.425 |
| 21 | 17 3 46.96 | 2.2920 | 27 29 21.3 | 4.287 |
| 22 | 17 6 4.61 | 2.2962 | 27 33 34.5 | 4.148 |
| 23 | 17 8 22.51 | 2.3005 | S.27 37 39.2 | 4.008 |

#### SATURDAY, NOV. 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 10 40.67 | 2.3047 | S.27 41 35.4 | 3.868 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ☽ First Quarter, . | 6 | 17 | 37.8 |
| ○ Full Moon, . . | 13 | 10 | 59.4 |
| ☾ Last Quarter, . . | 20 | 6 | 6.7 |
| ● New Moon, . . | 28 | 9 | 54.8 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . . | 13 | 6.5 |
| ☾ Apogee, . . . . . | 26 | 14.6 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 25 20 49 | 3440 | 26 42 20 | 3437 | 28 3 55 | 3434 | 29 25 33 | 3431 |
| | Antares | E. | 34 2 56 | 3062 | 32 34 0 | 3060 | 31 5 2 | 3059 | 29 36 2 | 3056 |
| | Mars | E. | 36 9 50 | 3347 | 34 46 33 | 3346 | 33 23 15 | 3345 | 31 59 55 | 3343 |
| | α Aquilæ | E. | 87 18 59 | 3903 | 86 5 42 | 3904 | 84 52 26 | 3905 | 83 39 11 | 3907 |
| 2 | Sun | W. | 36 14 37 | 3412 | 37 36 40 | 3408 | 38 58 48 | 3402 | 40 21 2 | 3397 |
| | Venus | W. | 16 36 15 | 3535 | 17 56 1 | 3527 | 19 15 55 | 3520 | 20 35 57 | 3512 |
| | Mars | E. | 25 2 56 | 3369 | 23 39 30 | 3339 | 22 16 4 | 3339 | 20 52 38 | 3340 |
| | α Aquilæ | E. | 77 33 45 | 3930 | 76 20 56 | 3937 | 75 8 14 | 3945 | 73 55 40 | 3955 |
| | Fomalhaut | E. | 104 5 39 | 3254 | 102 40 34 | 3247 | 101 15 21 | 3241 | 99 50 0 | 3234 |
| 3 | Sun | W. | 47 13 47 | 3366 | 48 36 42 | 3359 | 49 59 45 | 3352 | 51 22 56 | 3344 |
| | Venus | W. | 27 18 11 | 3477 | 28 39 1 | 3469 | 30 0 0 | 3460 | 31 21 9 | 3450 |
| | α Aquilæ | E. | 67 55 32 | 4019 | 66 44 11 | 4036 | 65 33 7 | 4054 | 64 22 21 | 4075 |
| | Fomalhaut | E. | 92 41 16 | 3201 | 91 15 8 | 3194 | 89 48 52 | 3187 | 88 22 27 | 3180 |
| | Jupiter | E. | 125 30 17 | 2950 | 123 59 1 | 2943 | 122 27 37 | 2937 | 120 56 5 | 2929 |
| 4 | Sun | W. | 58 21 18 | 3300 | 59 45 30 | 3289 | 61 9 52 | 3279 | 62 34 30 | 3267 |
| | Venus | W. | 38 9 28 | 3404 | 39 31 40 | 3393 | 40 54 5 | 3383 | 42 16 41 | 3371 |
| | α Aquilæ | E. | 58 34 11 | 4212 | 57 25 56 | 4248 | 56 18 15 | 4287 | 55 11 10 | 4329 |
| | Fomalhaut | E. | 81 8 18 | 3144 | 79 41 2 | 3136 | 78 13 38 | 3130 | 76 46 5 | 3123 |
| | α Pegasi | E. | 102 32 58 | 3262 | 101 8 2 | 3250 | 99 42 52 | 3237 | 98 17 27 | 3225 |
| | Jupiter | E. | 113 15 57 | 2888 | 111 43 23 | 2880 | 110 10 38 | 2870 | 108 37 41 | 2860 |
| 5 | Sun | W. | 69 40 51 | 3209 | 71 6 49 | 3195 | 72 33 4 | 3182 | 73 59 35 | 3168 |
| | Venus | W. | 49 13 6 | 3309 | 50 37 7 | 3295 | 52 1 24 | 3282 | 53 25 56 | 3268 |
| | Fomalhaut | E. | 69 26 9 | 3087 | 67 57 44 | 3082 | 66 29 12 | 3074 | 65 0 31 | 3069 |
| | α Pegasi | E. | 91 6 42 | 3164 | 89 39 50 | 3152 | 88 12 43 | 3140 | 86 45 22 | 3129 |
| | Jupiter | E. | 100 49 37 | 2806 | 99 15 17 | 2795 | 97 40 42 | 2782 | 96 5 51 | 2769 |
| 6 | Sun | W. | 81 16 26 | 3094 | 82 44 43 | 3078 | 84 13 19 | 3062 | 85 42 15 | 3045 |
| | Venus | W. | 60 32 54 | 3191 | 61 59 14 | 3175 | 63 25 53 | 3158 | 64 52 53 | 3142 |
| | Antares | W. | 26 48 4 | 2746 | 28 23 43 | 2732 | 29 59 41 | 2716 | 31 36 0 | 2701 |
| | Mars | W. | 21 26 17 | 3039 | 22 55 42 | 3018 | 24 25 33 | 2997 | 25 55 49 | 2977 |
| | Fomalhaut | E. | 57 35 20 | 3042 | 56 5 59 | 3039 | 54 36 35 | 3037 | 53 7 8 | 3034 |
| | α Pegasi | E. | 79 25 7 | 3072 | 77 56 23 | 3061 | 76 27 26 | 3051 | 74 58 16 | 3040 |
| | Jupiter | E. | 88 7 18 | 2702 | 86 30 41 | 2687 | 84 53 44 | 2673 | 83 16 28 | 2657 |
| 7 | Sun | W. | 93 12 10 | 2958 | 94 43 15 | 2940 | 96 14 43 | 2922 | 97 46 34 | 2903 |
| | Venus | W. | 72 13 0 | 3053 | 73 42 7 | 3034 | 75 11 38 | 3015 | 76 41 32 | 2996 |
| | Antares | W. | 39 42 47 | 2621 | 41 21 14 | 2603 | 43 0 5 | 2586 | 44 39 19 | 2569 |
| | Mars | W. | 33 33 12 | 2883 | 35 5 53 | 2864 | 36 38 58 | 2844 | 38 12 29 | 2825 |
| | α Pegasi | E. | 67 29 25 | 2996 | 65 59 7 | 2989 | 64 28 40 | 2983 | 62 58 5 | 2977 |
| | Jupiter | E. | 75 4 50 | 2578 | 73 25 25 | 2562 | 71 45 38 | 2545 | 70 5 27 | 2527 |
| | α Arietis | E. | 108 38 56 | 2666 | 107 1 33 | 2651 | 105 23 47 | 2632 | 103 45 36 | 2615 |
| 8 | Sun | W. | 105 31 52 | 2808 | 107 6 10 | 2788 | 108 40 54 | 2769 | 110 16 3 | 2749 |
| | Venus | W. | 84 16 57 | 2901 | 85 49 15 | 2880 | 87 21 59 | 2860 | 88 55 9 | 2838 |
| | Antares | W. | 53 1 32 | 2480 | 54 43 13 | 2462 | 56 25 20 | 2443 | 58 7 53 | 2425 |
| | Mars | W. | 46 6 19 | 2728 | 47 42 22 | 2708 | 49 18 51 | 2689 | 50 55 46 | 2669 |
| | α Pegasi | E. | 55 24 0 | 2969 | 53 53 8 | 2973 | 52 22 21 | 2979 | 50 51 42 | 2987 |
| | Jupiter | E. | 61 38 30 | 2440 | 59 55 52 | 2422 | 58 12 48 | 2404 | 56 29 19 | 2386 |
| | α Arietis | E. | 95 28 32 | 2524 | 93 47 52 | 2505 | 92 6 46 | 2487 | 90 25 15 | 2469 |
| 9 | Sun | W. | 118 18 20 | 2651 | 119 56 6 | 2632 | 121 34 18 | 2612 | 123 12 56 | 2593 |

GREENWICH MEAN TIME.

LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XV^h. | P. L. of Diff. | XVIII^h. | P. L. of Diff. | XXI^h. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 30 47 14 | 3428 | 32 8 59 | 3425 | 33 30 47 | 3422 | 34 52 39 | 3416 |
| | Antares | E. | 28 6 58 | 3052 | 26 37 50 | 3050 | 25 8 30 | 3046 | 23 39 23 | 3041 |
| | Mars | E. | 30 36 33 | 3343 | 29 13 11 | 3341 | 27 49 47 | 3340 | 26 26 22 | 3339 |
| | α Aquilæ | E. | 82 25 58 | 3910 | 81 12 48 | 3915 | 79 59 43 | 3918 | 78 46 41 | 3923 |
| 2 | Sun | W. | 41 43 22 | 3391 | 43 5 49 | 3386 | 44 28 21 | 3380 | 45 51 0 | 3373 |
| | Venus | W. | 21 56 8 | 3506 | 23 16 27 | 3497 | 24 36 54 | 3490 | 25 57 29 | 3484 |
| | Mars | E. | 19 29 13 | 3342 | 18 5 50 | 3346 | 16 42 32 | 3351 | 15 19 20 | 3364 |
| | α Aquilæ | E. | 72 43 16 | 3965 | 71 31 2 | 3976 | 70 18 59 | 3989 | 69 7 9 | 4003 |
| | Fomalhaut | E. | 98 24 31 | 3228 | 96 58 55 | 3220 | 95 33 10 | 3214 | 94 7 18 | 3207 |
| 3 | Sun | W. | 52 46 17 | 3336 | 54 9 47 | 3327 | 55 33 27 | 3319 | 56 57 17 | 3309 |
| | Venus | W. | 32 42 29 | 3441 | 34 3 59 | 3433 | 35 25 38 | 3424 | 36 47 27 | 3414 |
| | α Aquilæ | E. | 63 11 55 | 4098 | 62 1 51 | 4122 | 60 52 11 | 4150 | 59 42 57 | 4179 |
| | Fomalhaut | E. | 86 55 54 | 3173 | 85 29 13 | 3166 | 84 2 23 | 3159 | 82 35 25 | 3152 |
| | Jupiter | E. | 119 24 23 | 2922 | 117 52 32 | 2914 | 116 20 31 | 2906 | 114 48 20 | 2897 |
| 4 | Sun | W. | 63 59 20 | 3257 | 65 24 22 | 3245 | 66 49 38 | 3234 | 68 15 7 | 3221 |
| | Venus | W. | 43 39 31 | 3359 | 45 2 34 | 3347 | 46 25 51 | 3336 | 47 49 21 | 3323 |
| | α Aquilæ | E. | 54 4 44 | 4378 | 52 59 3 | 4428 | 51 54 7 | 4486 | 50 50 3 | 4549 |
| | Fomalhaut | E. | 75 18 23 | 3115 | 73 50 32 | 3109 | 72 22 33 | 3102 | 70 54 26 | 3094 |
| | α Pegasi | E. | 96 51 47 | 3213 | 95 25 53 | 3200 | 93 59 44 | 3188 | 92 33 20 | 3176 |
| | Jupiter | E. | 107 4 31 | 2850 | 105 31 8 | 2840 | 103 57 32 | 2829 | 102 23 42 | 2818 |
| 5 | Sun | W. | 75 26 22 | 3154 | 76 53 26 | 3139 | 78 20 48 | 3124 | 79 48 28 | 3110 |
| | Venus | W. | 54 50 45 | 3253 | 56 15 52 | 3239 | 57 41 15 | 3225 | 59 6 55 | 3209 |
| | Fomalhaut | E. | 63 31 43 | 3062 | 62 2 47 | 3056 | 60 33 44 | 3052 | 59 4 35 | 3047 |
| | α Pegasi | E. | 85 17 47 | 3117 | 83 49 58 | 3105 | 82 21 55 | 3094 | 80 53 38 | 3082 |
| | Jupiter | E. | 94 30 43 | 2757 | 92 55 19 | 2744 | 91 19 37 | 2730 | 89 43 37 | 2716 |
| 6 | Sun | W. | 87 11 32 | 3029 | 88 41 9 | 3012 | 90 11 7 | 2994 | 91 41 27 | 2976 |
| | Venus | W. | 66 20 12 | 3124 | 67 47 52 | 3107 | 69 15 53 | 3090 | 70 44 15 | 3071 |
| | Antares | W. | 33 12 39 | 2686 | 34 49 38 | 2669 | 36 26 59 | 2653 | 38 4 42 | 2637 |
| | Mars | W. | 27 26 30 | 2958 | 28 57 35 | 2940 | 30 29 3 | 2921 | 32 0 55 | 2901 |
| | Fomalhaut | E. | 51 37 38 | 3035 | 50 8 9 | 3036 | 48 38 41 | 3039 | 47 9 16 | 3040 |
| | α Pegasi | E. | 73 28 53 | 3030 | 71 59 18 | 3021 | 70 29 31 | 3012 | 68 59 33 | 3004 |
| | Jupiter | E. | 81 38 51 | 2642 | 80 0 53 | 2626 | 78 22 34 | 2610 | 76 43 53 | 2594 |
| 7 | Sun | W. | 99 18 49 | 2884 | 100 51 28 | 2866 | 102 24 31 | 2846 | 103 57 59 | 2827 |
| | Venus | W. | 78 11 50 | 2977 | 79 42 31 | 2958 | 81 13 36 | 2940 | 82 45 4 | 2920 |
| | Antares | W. | 46 18 57 | 2551 | 47 58 59 | 2533 | 49 39 26 | 2516 | 51 20 17 | 2499 |
| | Mars | W. | 39 46 25 | 2805 | 41 20 46 | 2786 | 42 55 32 | 2768 | 44 30 42 | 2747 |
| | α Pegasi | E. | 61 27 24 | 2973 | 59 56 37 | 2969 | 58 25 46 | 2968 | 56 54 53 | 2968 |
| | Jupiter | E. | 68 24 52 | 2510 | 66 43 53 | 2493 | 65 2 30 | 2476 | 63 20 43 | 2458 |
| | α Arietis | E. | 102 7 1 | 2596 | 100 28 1 | 2578 | 98 48 36 | 2560 | 97 8 46 | 2543 |
| 8 | Sun | W. | 111 51 38 | 2729 | 113 27 39 | 2710 | 115 4 6 | 2689 | 116 41 0 | 2670 |
| | Venus | W. | 90 28 47 | 2815 | 92 2 55 | 2795 | 93 37 29 | 2778 | 95 12 26 | 2759 |
| | Antares | W. | 59 50 52 | 2406 | 61 34 16 | 2389 | 63 18 6 | 2371 | 65 2 23 | 2352 |
| | Mars | W. | 52 33 8 | 2649 | 54 10 57 | 2630 | 55 49 11 | 2610 | 57 27 52 | 2591 |
| | α Pegasi | E. | 49 21 13 | 2999 | 47 50 59 | 3014 | 46 21 3 | 3033 | 44 51 31 | 3057 |
| | Jupiter | E. | 54 45 24 | 2368 | 53 1 4 | 2350 | 51 16 18 | 2333 | 49 31 7 | 2315 |
| | α Arietis | E. | 88 43 18 | 2451 | 87 0 56 | 2432 | 85 18 7 | 2415 | 83 34 54 | 2397 |
| 9 | Sun | W. | 124 52 0 | 2574 | 126 31 30 | 2556 | 128 11 26 | 2538 | 129 51 47 | 2519 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 9 | Venus | W. | 96 47 48 | 2740 | 98 23 35 | 2720 | 99 59 48 | 2700 | 101 36 28 | 2681 |
| | Antares | W. | 66 47 7 | 2335 | 68 32 16 | 2317 | 70 17 51 | 2299 | 72 3 52 | 2281 |
| | Mars | W. | 59 6 59 | 2572 | 60 46 33 | 2553 | 62 26 33 | 2534 | 64 6 59 | 2515 |
| | a Pegasi | E. | 43 22 29 | 3086 | 41 54 2 | 3121 | 40 26 18 | 3164 | 38 59 26 | 3215 |
| | Jupiter | E. | 47 45 29 | 2296 | 45 59 22 | 2277 | 44 12 49 | 2260 | 42 25 51 | 2243 |
| | a Arietis | E. | 81 51 15 | 2379 | 80 7 10 | 2362 | 78 22 40 | 2344 | 76 37 45 | 2327 |
| 10 | Antares | W. | 81 0 29 | 2195 | 82 49 4 | 2179 | 84 38 3 | 2164 | 86 27 25 | 2148 |
| | Mars | W. | 72 35 40 | 2421 | 74 18 41 | 2407 | 76 2 6 | 2390 | 77 45 55 | 2374 |
| | Jupiter | E. | 33 24 37 | 2159 | 31 35 7 | 2143 | 29 45 13 | 2128 | 27 54 56 | 2112 |
| | a Arietis | E. | 67 47 5 | 2247 | 65 59 48 | 2232 | 64 12 8 | 2218 | 62 24 8 | 2204 |
| | Aldebaran | E. | 98 20 1 | 2259 | 96 33 1 | 2242 | 94 45 36 | 2225 | 92 57 46 | 2210 |
| 11 | Mars | W. | 86 30 37 | 2300 | 88 16 37 | 2286 | 90 2 57 | 2274 | 91 49 34 | 2263 |
| | a Aquilæ | W. | 52 52 41 | 3558 | 54 12 1 | 3477 | 55 32 51 | 3401 | 56 55 6 | 3333 |
| | a Arietis | E. | 53 19 16 | 2147 | 51 29 29 | 2137 | 49 39 27 | 2130 | 47 49 14 | 2124 |
| | Aldebaran | E. | 83 53 3 | 2140 | 82 3 5 | 2128 | 80 12 49 | 2117 | 78 22 16 | 2106 |
| | Saturn | E. | 120 17 4 | 2116 | 118 26 29 | 2103 | 116 35 34 | 2089 | 114 44 18 | 2077 |
| 12 | Mars | W. | 100 46 41 | 2214 | 102 34 48 | 2206 | 104 23 7 | 2199 | 106 11 36 | 2193 |
| | a Aquilæ | W. | 64 4 10 | 3069 | 65 32 58 | 3030 | 67 2 34 | 2993 | 68 32 55 | 2961 |
| | Fomalhaut | W. | 32 38 52 | 2753 | 34 14 21 | 2675 | 35 51 34 | 2608 | 37 30 18 | 2550 |
| | a Arietis | E. | 38 36 16 | 2112 | 36 45 35 | 2116 | 34 55 0 | 2122 | 33 4 34 | 2132 |
| | Aldebaran | E. | 69 5 49 | 2066 | 67 13 57 | 2061 | 65 21 57 | 2056 | 63 29 50 | 2053 |
| | Saturn | E. | 105 23 34 | 2026 | 103 30 40 | 2018 | 101 37 34 | 2011 | 99 44 17 | 2006 |
| 13 | a Aquilæ | W. | 76 13 27 | 2848 | 77 46 53 | 2834 | 79 20 37 | 2822 | 80 54 36 | 2815 |
| | Fomalhaut | W. | 46 0 57 | 2356 | 47 45 35 | 2331 | 49 30 49 | 2311 | 51 16 33 | 2293 |
| | Jupiter | W. | 11 52 22 | 1923 | 13 47 57 | 1923 | 15 43 34 | 1923 | 17 39 10 | 1923 |
| | a Pegasi | W. | 29 21 18 | 3627 | 30 39 23 | 3444 | 32 0 50 | 3291 | 33 25 12 | 3161 |
| | Aldebaran | E. | 54 8 36 | 2063 | 52 16 25 | 2068 | 50 24 21 | 2063 | 48 32 25 | 2071 |
| | Saturn | E. | 90 15 52 | 1986 | 88 21 56 | 1985 | 86 27 58 | 1985 | 84 34 0 | 1986 |
| | Pollux | E. | 97 23 11 | 1958 | 95 28 30 | 1956 | 93 33 47 | 1956 | 91 39 4 | 1957 |
| 14 | Fomalhaut | W. | 60 10 31 | 2241 | 61 57 58 | 2237 | 63 45 31 | 2235 | 65 33 7 | 2234 |
| | a Pegasi | W. | 40 59 28 | 2761 | 42 35 0 | 2702 | 44 11 37 | 2660 | 45 49 11 | 2625 |
| | Jupiter | W. | 27 16 36 | 1938 | 29 11 49 | 1942 | 31 6 55 | 1948 | 33 1 51 | 1955 |
| | Aldebaran | E. | 39 16 30 | 2135 | 37 26 24 | 2156 | 35 36 50 | 2179 | 33 47 51 | 2206 |
| | Saturn | E. | 75 4 51 | 2002 | 73 11 20 | 2007 | 71 17 57 | 2014 | 69 24 45 | 2022 |
| | Pollux | E. | 82 6 8 | 1972 | 80 11 49 | 1977 | 78 17 38 | 1982 | 76 23 36 | 1991 |
| 15 | Fomalhaut | W. | 74 30 34 | 2253 | 76 17 43 | 2261 | 78 4 40 | 2270 | 79 51 24 | 2280 |
| | a Pegasi | W. | 54 6 45 | 2520 | 55 47 31 | 2510 | 57 28 31 | 2502 | 59 9 41 | 2497 |
| | Jupiter | W. | 42 33 16 | 2000 | 44 26 50 | 2011 | 46 20 7 | 2024 | 48 13 4 | 2037 |
| | Saturn | E. | 60 2 9 | 2072 | 58 10 27 | 2085 | 56 19 4 | 2098 | 54 28 1 | 2111 |
| | Pollux | E. | 66 56 38 | 2036 | 65 4 0 | 2048 | 63 11 40 | 2059 | 61 19 38 | 2071 |
| | Regulus | E. | 103 38 2 | 2042 | 101 45 34 | 2053 | 99 53 23 | 2066 | 98 1 31 | 2077 |
| 16 | Fomalhaut | W. | 88 40 55 | 2344 | 90 25 50 | 2360 | 92 10 22 | 2377 | 93 54 30 | 2394 |
| | a Pegasi | W. | 67 36 6 | 2506 | 69 17 11 | 2513 | 70 58 6 | 2521 | 72 38 50 | 2531 |
| | Jupiter | W. | 57 32 42 | 2107 | 59 23 31 | 2122 | 61 13 56 | 2138 | 63 3 57 | 2155 |
| | a Arietis | W. | 24 0 58 | 2398 | 25 44 35 | 2382 | 27 28 35 | 2372 | 29 12 50 | 2367 |
| | Saturn | E. | 45 18 32 | 2194 | 43 29 55 | 2212 | 41 41 46 | 2233 | 39 54 7 | 2253 |
| | Pollux | E. | 52 4 32 | 2143 | 50 14 38 | 2158 | 48 25 7 | 2174 | 46 36 1 | 2190 |
| | Regulus | E. | 88 47 10 | 2148 | 86 57 24 | 2164 | 85 8 2 | 2180 | 83 19 4 | 2196 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 9 | Venus | W. | 103 13 34 | 2661 | 104 51 6 | 2643 | 106 29 3 | 2624 | 108 7 26 | 2606 |
| | Antares | W. | 73 50 20 | 2263 | 75 37 14 | 2245 | 77 24 34 | 2229 | 79 12 18 | 2212 |
| | Mars | W. | 65 47 52 | 2496 | 67 29 11 | 2477 | 69 10 56 | 2460 | 70 53 5 | 2442 |
| | α Pegasi | E. | 37 33 35 | 3277 | 36 8 57 | 3351 | 34 45 44 | 3440 | 33 24 13 | 3552 |
| | Jupiter | E. | 40 38 27 | 2226 | 38 50 38 | 2209 | 37 2 24 | 2191 | 35 13 43 | 2174 |
| | α Arietis | E. | 74 52 25 | 2310 | 73 6 40 | 2294 | 71 20 32 | 2278 | 69 34 0 | 2262 |
| 10 | Antares | W. | 88 17 11 | 2132 | 90 7 21 | 2117 | 91 57 54 | 2104 | 73 48 47 | 2090 |
| | Mars | W. | 79 30 7 | 2359 | 81 14 41 | 2343 | 82 59 38 | 2328 | 84 44 57 | 2313 |
| | Jupiter | E. | 26 4 15 | 2097 | 24 13 11 | 2083 | 22 21 45 | 2069 | 20 29 58 | 2055 |
| | α Arietis | E. | 60 35 47 | 2191 | 58 47 6 | 2179 | 56 58 7 | 2167 | 55 8 50 | 2156 |
| | Aldebaran | E. | 91 9 34 | 2195 | 89 20 59 | 2180 | 87 32 2 | 2166 | 85 42 43 | 2152 |
| 11 | Mars | W. | 93 36 28 | 2251 | 95 23 39 | 2241 | 97 11 6 | 2231 | 98 58 47 | 2223 |
| | α Aquilæ | W. | 58 18 39 | 3270 | 59 43 25 | 3220 | 61 9 19 | 3160 | 62 36 16 | 3118 |
| | α Arietis | E. | 45 58 51 | 2118 | 44 8 19 | 2114 | 42 17 41 | 2111 | 40 26 59 | 2111 |
| | Aldebaran | E. | 76 31 26 | 2097 | 74 40 22 | 2087 | 72 49 3 | 2079 | 70 57 32 | 2072 |
| | Saturn | E. | 112 52 43 | 2066 | 111 0 51 | 2054 | 109 8 41 | 2044 | 107 16 15 | 2034 |
| 12 | Mars | W. | 108 0 14 | 2186 | 109 49 0 | 2184 | 111 37 52 | 2180 | 113 26 49 | 2178 |
| | α Aquilæ | W. | 70 3 57 | 2932 | 71 35 35 | 2908 | 73 7 44 | 2884 | 74 40 23 | 2865 |
| | Fomalhaut | W. | 39 10 22 | 2499 | 40 51 36 | 2455 | 42 33 52 | 2418 | 44 17 1 | 2385 |
| | α Arietis | E. | 31 14 23 | 2146 | 29 24 32 | 2161 | 27 35 5 | 2184 | 25 46 14 | 2211 |
| | Aldebaran | E. | 61 37 39 | 2051 | 59 45 24 | 2050 | 57 53 7 | 2050 | 56 0 50 | 2052 |
| | Saturn | E. | 97 50 50 | 2000 | 95 57 15 | 1995 | 94 3 33 | 1991 | 92 9 44 | 1989 |
| 13 | α Aquilæ | W. | 82 28 45 | 2808 | 84 3 3 | 2805 | 85 37 25 | 2802 | 87 11 50 | 2800 |
| | Fomalhaut | W. | 53 2 43 | 2278 | 54 49 15 | 2264 | 56 36 7 | 2254 | 58 23 14 | 2247 |
| | Jupiter | W. | 19 34 46 | 1924 | 21 30 20 | 1927 | 23 25 50 | 1929 | 25 21 16 | 1933 |
| | α Pegasi | W. | 34 52 8 | 3061 | 36 21 18 | 2967 | 37 52 25 | 2878 | 39 25 12 | 2809 |
| | Aldebaran | E. | 46 40 41 | 2079 | 44 49 10 | 2090 | 42 57 56 | 2103 | 41 7 1 | 2118 |
| | Saturn | E. | 82 40 2 | 1987 | 80 46 7 | 1989 | 78 52 16 | 1993 | 76 58 30 | 1997 |
| | Pollux | E. | 89 44 22 | 1958 | 87 49 41 | 1961 | 85 55 5 | 1964 | 84 0 34 | 1967 |
| 14 | Fomalhaut | W. | 67 20 44 | 2235 | 69 8 20 | 2238 | 70 55 51 | 2241 | 72 43 17 | 2247 |
| | α Pegasi | W. | 47 27 32 | 2594 | 49 6 35 | 2570 | 50 46 11 | 2549 | 52 26 16 | 2532 |
| | Jupiter | W. | 34 56 36 | 1963 | 36 51 8 | 1972 | 38 45 26 | 1982 | 40 39 28 | 1991 |
| | Aldebaran | E. | 31 59 33 | 2239 | 30 12 4 | 2277 | 28 25 30 | 2321 | 26 40 1 | 2373 |
| | Saturn | E. | 67 31 45 | 2030 | 65 38 58 | 2040 | 63 46 26 | 2050 | 61 54 9 | 2061 |
| | Pollux | E. | 74 29 47 | 1997 | 72 36 8 | 2007 | 70 42 44 | 2015 | 68 49 33 | 2025 |
| 15 | Fomalhaut | W. | 81 37 53 | 2290 | 83 24 7 | 2302 | 85 10 3 | 2316 | 86 55 39 | 2330 |
| | α Pegasi | W. | 60 50 58 | 2495 | 62 32 18 | 2496 | 64 13 37 | 2497 | 65 54 54 | 2501 |
| | Jupiter | W. | 50 5 41 | 2050 | 51 57 58 | 2062 | 53 49 55 | 2077 | 55 41 30 | 2092 |
| | Saturn | E. | 52 37 19 | 2126 | 50 47 0 | 2142 | 48 57 5 | 2159 | 47 7 35 | 2177 |
| | Pollux | E. | 59 27 54 | 2085 | 57 36 31 | 2099 | 55 45 30 | 2113 | 53 54 50 | 2127 |
| | Regulus | E. | 96 9 56 | 2091 | 94 18 43 | 2104 | 92 27 50 | 2118 | 90 37 19 | 2133 |
| 16 | Fomalhaut | W. | 95 38 14 | 2412 | 97 21 31 | 2431 | 99 4 22 | 2450 | 100 46 46 | 2470 |
| | α Pegasi | W. | 74 19 20 | 2541 | 75 59 36 | 2553 | 77 39 35 | 2566 | 79 19 17 | 2580 |
| | Jupiter | W. | 64 53 33 | 2171 | 66 42 44 | 2188 | 68 31 30 | 2205 | 70 19 50 | 2223 |
| | α Arietis | W. | 30 57 12 | 2366 | 32 41 36 | 2368 | 34 25 57 | 2372 | 36 10 12 | 2380 |
| | Saturn | E. | 38 6 58 | 2274 | 36 20 21 | 2298 | 34 34 18 | 2322 | 32 48 50 | 2346 |
| | Pollux | E. | 44 47 19 | 2208 | 42 59 3 | 2225 | 41 11 13 | 2243 | 39 23 49 | 2260 |
| | Regulus | E. | 81 30 30 | 2114 | 79 42 23 | 2130 | 77 54 40 | 2148 | 76 7 24 | 2164 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 17 | α Pegasi W. | 80 58 39 | 2595 | 82 37 41 | 2610 | 84 16 22 | 2626 | 85 54 41 | 2643 |
| | Jupiter W. | 72 7 43 | 2241 | 73 55 9 | 2260 | 75 42 8 | 2277 | 77 28 41 | 2296 |
| | α Arietis W. | 37 54 16 | 2388 | 39 38 8 | 2396 | 41 21 46 | 2409 | 43 5 8 | 2421 |
| | Pollux E. | 37 36 51 | 2279 | 35 50 20 | 2297 | 34 4 16 | 2315 | 32 18 39 | 2335 |
| | Regulus E. | 74 20 32 | 2284 | 72 34 9 | 2302 | 70 48 12 | 2321 | 69 2 43 | 2339 |
| | Sun E. | 130 39 30 | 2589 | 129 0 20 | 2608 | 127 21 36 | 2629 | 125 43 20 | 2648 |
| 18 | α Pegasi W. | 94 0 13 | 2739 | 95 36 1 | 2760 | 97 11 22 | 2780 | 98 46 16 | 2803 |
| | Jupiter W. | 86 14 38 | 2389 | 87 58 29 | 2408 | 89 41 52 | 2427 | 91 24 48 | 2446 |
| | α Arietis W. | 51 37 12 | 2493 | 53 18 35 | 2509 | 54 59 36 | 2526 | 56 40 13 | 2541 |
| | Aldebaran W. | 22 21 2 | 2862 | 23 54 10 | 2826 | 25 28 4 | 2799 | 27 2 33 | 2781 |
| | Regulus E. | 60 22 5 | 2434 | 58 39 19 | 2453 | 56 57 0 | 2473 | 55 15 9 | 2492 |
| | Sun E. | 117 38 43 | 2750 | 116 3 9 | 2769 | 114 28 1 | 2791 | 112 53 21 | 2816 |
| 19 | Jupiter W. | 99 52 55 | 2538 | 101 33 16 | 2555 | 103 13 13 | 2572 | 104 52 46 | 2591 |
| | α Arietis W. | 64 57 42 | 2626 | 66 36 2 | 2641 | 68 14 1 | 2659 | 69 51 36 | 2675 |
| | Aldebaran W. | 34 58 40 | 2760 | 36 34 1 | 2763 | 38 9 18 | 2769 | 39 44 27 | 2776 |
| | Regulus E. | 46 52 34 | 2588 | 45 13 22 | 2607 | 43 34 36 | 2626 | 41 56 16 | 2644 |
| | Sun E. | 105 6 29 | 2911 | 103 34 24 | 2930 | 102 2 43 | 2950 | 100 31 27 | 2969 |
| 20 | Jupiter W. | 113 4 32 | 2675 | 114 41 46 | 2690 | 116 18 39 | 2706 | 117 55 11 | 2722 |
| | α Arietis W. | 77 54 6 | 2755 | 79 29 33 | 2770 | 81 4 40 | 2786 | 82 39 26 | 2801 |
| | Aldebaran W. | 47 37 29 | 2822 | 49 11 28 | 2832 | 50 45 14 | 2844 | 52 18 45 | 2854 |
| | Regulus E. | 33 50 51 | 2736 | 32 14 59 | 2755 | 30 39 32 | 2773 | 29 4 29 | 2792 |
| | Sun E. | 93 0 57 | 3059 | 91 31 57 | 3076 | 90 3 18 | 3093 | 88 35 0 | 3110 |
| 21 | Aldebaran W. | 60 2 49 | 2910 | 61 34 55 | 2921 | 63 6 47 | 2931 | 64 38 26 | 2942 |
| | Saturn W. | 23 26 22 | 2974 | 24 57 7 | 2972 | 26 27 55 | 2971 | 27 58 44 | 2973 |
| | Pollux W. | 15 47 28 | 2845 | 17 20 58 | 2855 | 18 54 14 | 2866 | 20 27 16 | 2877 |
| | Sun E. | 81 18 28 | 3188 | 79 52 5 | 3203 | 78 25 59 | 3217 | 77 0 10 | 3231 |
| 22 | Aldebaran W. | 72 13 27 | 2992 | 73 43 50 | 3001 | 75 14 2 | 3009 | 76 44 3 | 3013 |
| | Saturn W. | 35 31 57 | 2993 | 37 2 18 | 2999 | 38 32 32 | 3004 | 40 2 40 | 3009 |
| | Pollux W. | 28 9 1 | 2929 | 29 40 43 | 2939 | 31 12 13 | 2948 | 32 43 31 | 2958 |
| | Sun E. | 69 54 55 | 3298 | 68 30 35 | 3308 | 67 6 27 | 3314 | 65 42 32 | 3326 |
| 23 | Aldebaran W. | 84 11 38 | 3057 | 85 40 40 | 3064 | 87 9 34 | 3069 | 88 38 21 | 3076 |
| | Saturn W. | 47 31 31 | 3038 | 49 0 57 | 3043 | 50 30 16 | 3048 | 51 59 29 | 3052 |
| | Pollux W. | 40 17 19 | 2997 | 41 47 35 | 3005 | 43 17 42 | 3010 | 44 47 42 | 3017 |
| | Sun E. | 58 45 47 | 3371 | 57 22 57 | 3378 | 56 0 15 | 3386 | 54 37 42 | 3393 |
| 24 | Aldebaran W. | 96 0 25 | 3104 | 97 28 30 | 3109 | 98 56 29 | 3113 | 100 24 23 | 3116 |
| | Saturn W. | 59 24 13 | 3073 | 60 52 56 | 3076 | 62 21 35 | 3080 | 63 50 9 | 3082 |
| | Pollux W. | 52 15 53 | 3043 | 53 45 12 | 3047 | 55 14 26 | 3052 | 56 43 35 | 3054 |
| | Sun E. | 47 46 50 | 3423 | 46 24 59 | 3428 | 45 3 14 | 3432 | 43 41 34 | 3437 |
| 25 | Saturn W. | 71 12 18 | 3092 | 72 40 37 | 3095 | 74 8 53 | 3096 | 75 37 8 | 3096 |
| | Pollux W. | 64 8 25 | 3068 | 65 37 13 | 3069 | 67 6 40 | 3071 | 68 34 45 | 3073 |
| | Regulus W. | 27 36 27 | 3101 | 29 4 35 | 3101 | 30 32 45 | 3100 | 32 0 54 | 3098 |
| | Sun E. | 36 54 18 | 3454 | 35 33 2 | 3456 | 34 11 49 | 3459 | 32 50 39 | 3461 |
| 31 | Sun W. | 28 46 12 | 3322 | 30 9 58 | 3314 | 31 33 53 | 3307 | 32 57 56 | 3299 |
| | α Aquilæ E. | 60 44 29 | 4138 | 59 35 4 | 4171 | 58 26 10 | 4204 | 57 17 48 | 4244 |
| | Fomalhaut E. | 83 55 30 | 3149 | 82 28 20 | 3144 | 81 1 4 | 3140 | 79 33 43 | 3134 |
| | Jupiter E. | 113 14 10 | 2914 | 111 42 9 | 2908 | 110 10 0 | 2901 | 108 37 42 | 2894 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 17 | α Pegasi | W. | 87 32 37 | 2661 | 89 10 9 | 2680 | 90 47 16 | 2698 | 92 23 58 | 2719 |
| | Jupiter | W. | 79 14 47 | 2314 | 81 0 26 | 2333 | 82 45 37 | 2353 | 84 30 20 | 2070 |
| | α Arietis | W. | 44 48 13 | 2434 | 46 30 59 | 2449 | 48 13 24 | 2463 | 49 55 29 | 2479 |
| | Pollux | E. | 30 33 30 | 2354 | 28 48 49 | 2378 | 27 4 36 | 2393 | 25 20 51 | 2412 |
| | Regulus | E. | 67 17 40 | 2358 | 65 33 5 | 2377 | 63 48 57 | 2396 | 62 5 17 | 2416 |
| | Sun | E. | 124 5 30 | 2669 | 122 28 8 | 2688 | 120 51 12 | 2709 | 119 14 44 | 2729 |
| 18 | α Pegasi | W. | 100 20 40 | 2825 | 101 54 36 | 2847 | 103 28 3 | 2870 | 105 1 0 | 2894 |
| | Jupiter | W. | 93 7 17 | 2465 | 94 49 20 | 2483 | 96 30 57 | 2501 | 98 12 9 | 2520 |
| | α Arietis | W. | 58 20 29 | 2558 | 60 0 22 | 2575 | 61 39 51 | 2591 | 63 18 58 | 2608 |
| | Aldebaran | W. | 28 37 26 | 2769 | 30 12 34 | 2761 | 31 47 53 | 2757 | 33 23 17 | 2758 |
| | Regulus | E. | 53 33 44 | 2512 | 51 52 47 | 2530 | 50 12 16 | 2549 | 48 32 11 | 2569 |
| | Sun | E. | 111 19 6 | 2831 | 109 45 18 | 2851 | 108 11 56 | 2871 | 106 39 0 | 2891 |
| 19 | Jupiter | W. | 106 31 54 | 2609 | 108 10 37 | 2625 | 109 48 58 | 2642 | 111 26 56 | 2658 |
| | α Arietis | W. | 71 28 50 | 2691 | 73 5 42 | 2708 | 74 42 11 | 2723 | 76 18 20 | 2741 |
| | Aldebaran | W. | 41 19 26 | 2785 | 42 54 14 | 2792 | 44 28 52 | 2801 | 46 3 18 | 2813 |
| | Regulus | E. | 40 18 21 | 2662 | 38 40 50 | 2682 | 37 3 46 | 2700 | 35 27 6 | 2719 |
| | Sun | E. | 99 0 35 | 2988 | 97 30 7 | 3006 | 96 0 1 | 3024 | 94 30 18 | 3042 |
| 20 | Jupiter | W. | 119 31 22 | 2737 | 121 7 13 | 2750 | 122 42 46 | 2765 | 124 18 0 | 2779 |
| | α Arietis | W. | 84 13 52 | 2816 | 85 47 59 | 2831 | 87 21 47 | 2814 | 88 55 18 | 2855 |
| | Aldebaran | W. | 53 52 3 | 2866 | 55 25 6 | 2877 | 56 57 54 | 2888 | 58 30 28 | 2898 |
| | Regulus | E. | 27 29 51 | 2811 | 25 55 37 | 2831 | 24 21 49 | 2850 | 22 48 26 | 2869 |
| | Sun | E. | 87 7 3 | 3127 | 85 39 26 | 3143 | 84 12 8 | 3158 | 82 45 9 | 3173 |
| 21 | Aldebaran | W. | 66 9 52 | 2953 | 67 41 4 | 2962 | 69 12 4 | 2973 | 70 42 51 | 2981 |
| | Saturn | W. | 29 29 32 | 2975 | 31 0 16 | 2979 | 32 30 55 | 2983 | 34 1 29 | 2988 |
| | Pollux | W. | 22 0 4 | 2887 | 23 32 39 | 2899 | 25 4 59 | 2909 | 26 37 6 | 2919 |
| | Sun | E. | 75 34 37 | 3244 | 74 9 20 | 3256 | 72 44 17 | 3269 | 71 19 29 | 3281 |
| 22 | Aldebaran | W. | 78 13 53 | 3026 | 79 43 34 | 3034 | 81 13 5 | 3042 | 82 42 25 | 3049 |
| | Saturn | W. | 41·32 41 | 3016 | 43 2 34 | 3022 | 44 32 19 | 3027 | 46 1 58 | 3032 |
| | Pollux | W. | 34 14 37 | 2966 | 35 45 32 | 2974 | 37 16 17 | 2981 | 38 46 53 | 2989 |
| | Sun | E. | 64 18 49 | 3335 | 62 55 18 | 3344 | 61 31 57 | 3353 | 60 8 47 | 3362 |
| 23 | Aldebaran | W. | 90 7 0 | 3082 | 91 35 31 | 3087 | 93 3 56 | 3094 | 94 32 13 | 3098 |
| | Saturn | W. | 53 28 37 | 3057 | 54 57 39 | 3062 | 56 26 35 | 3066 | 57 55 26 | 3069 |
| | Pollux | W. | 46 17 34 | 3023 | 47 47 18 | 3028 | 49 16 56 | 3034 | 50 46 27 | 3038 |
| | Sun | E. | 53 15 17 | 3400 | 51 53 0 | 3406 | 50 30 50 | 3412 | 49 8 47 | 3417 |
| 24 | Aldebaran | W. | 101 52 13 | 3121 | 103 19 57 | 3125 | 104 47 36 | 3129 | 106 15 11 | 3132 |
| | Saturn | W. | 65 18 41 | 3085 | 66 47 9 | 3087 | 68 15 34 | 3089 | 69 43 57 | 3091 |
| | Pollux | W. | 58 12 41 | 3058 | 59 41 42 | 3061 | 61 10 39 | 3064 | 62 39 33 | 3066 |
| | Sun | E. | 42 19 59 | 3440 | 40 58 28 | 3444 | 39 37 1 | 3447 | 38 15 38 | 3450 |
| 25 | Saturn | W. | 77 5 23 | 3097 | 78 33 36 | 3098 | 80 1 48 | 3097 | 81 30 1 | 3098 |
| | Pollux | W. | 70 3 28 | 3074 | 71 32 9 | 3074 | 73 0 50 | 3074 | 74 29 30 | 3074 |
| | Regulus | W. | 33 29 6 | 3098 | 34 57 18 | 3096 | 36 25 32 | 3096 | 37 53 47 | 3097 |
| | Sun | E. | 31 29 31 | 3463 | 30 8 25 | 3463 | 28 47 20 | 3465 | 27 26 17 | 3467 |
| 31 | Sun | W. | 34 22 9 | 3290 | 35 46 32 | 3282 | 37 11 5 | 3274 | 38 35 47 | 3265 |
| | α Aquilæ | E. | 56 10 3 | 4284 | 55 2 56 | 4332 | 53 56 33 | 4381 | 52 50 55 | 4433 |
| | Fomalhaut | E. | 78 6 15 | 3130 | 76 38 42 | 3126 | 75 11 4 | 3123 | 73 43 22 | 3119 |
| | Jupiter | E. | 107 5 16 | 2887 | 105 32 41 | 2881 | 103 59 58 | 2874 | 102 27 6 | 2866 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S |  |  |  |  | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
|  |  | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semidiameter. |  |  |  |
|  |  | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Sat. | 1 | 14 27 29.46 | 9.819 | S.14 35 46.8 | 47.87 | 16 10.02 | 67.00 | 16 17.61 | 0.038 |
| *Sun.* | 2 | 14 31 25.49 | 9.852 | 14 54 48.7 | 47.28 | 16 10.27 | 67.12 | 16 18.13 | 0.005 |
| Mon. | 3 | 14 35 22.33 | 9.886 | 15 13 36.1 | 46.65 | 16 10.52 | 67.24 | 16 17.86 | 0.029 |
| Tues. | 4 | 14 39 19.95 | 9.919 | 15 32 8.3 | 46.02 | 16 10.77 | 67.36 | 16 16.79 | 0.063 |
| Wed. | 5 | 14 43 18.41 | 9.952 | 15 50 25.0 | 45.35 | 16 11.02 | 67.49 | 16 14.89 | 0.097 |
| Thur. | 6 | 14 47 17.69 | 9.986 | 16 8 25.6 | 44.68 | 16 11.26 | 67.61 | 16 12.19 | 0.130 |
| Fri. | 7 | 14 51 17.77 | 10.020 | 16 26 10.3 | 43.99 | 16 11.50 | 67.73 | 16 8.67 | 0.164 |
| Sat. | 8 | 14 55 18.67 | 10.055 | 16 43 38.0 | 43.29 | 16 11.74 | 67.85 | 16 4.33 | 0.198 |
| *Sun.* | 9 | 14 59 20.40 | 10.090 | 17 0 48.6 | 42.56 | 16 11.97 | 67.96 | 15 59.17 | 0.233 |
| Mon. | 10 | 15 3 22.99 | 10.125 | 17 17 41.8 | 41.83 | 16 12.21 | 68.08 | 15 53.14 | 0.268 |
| Tues. | 11 | 15 7 26.41 | 10.160 | 17 34 17.3 | 41.08 | 16 12.44 | 68.20 | 15 46.30 | 0.303 |
| Wed. | 12 | 15 11 30.68 | 10.195 | 17 50 34.5 | 40.32 | 16 12.66 | 68.31 | 15 38.61 | 0.338 |
| Thur. | 13 | 15 15 35.78 | 10.230 | 18 6 33.1 | 39.53 | 16 12.87 | 68.43 | 15 30.10 | 0.373 |
| Fri. | 14 | 15 19 41.73 | 10.265 | 18 22 12.7 | 38.74 | 16 13.08 | 68.55 | 15 20.74 | 0.408 |
| Sat. | 15 | 15 23 48.56 | 10.301 | 18 37 32.9 | 37.92 | 16 13.28 | 68.66 | 15 10.48 | 0.444 |
| *Sun.* | 16 | 15 27 56.24 | 10.337 | 18 52 33.4 | 37.10 | 16 13.48 | 68.77 | 14 59.38 | 0.480 |
| Mon. | 17 | 15 32 4.79 | 10.373 | 19 7 14.0 | 36.26 | 16 13.68 | 68.89 | 14 47.43 | 0.515 |
| Tues. | 18 | 15 36 14.17 | 10.409 | 19 21 34.0 | 35.41 | 16 13.88 | 69.00 | 14 34.65 | 0.550 |
| Wed. | 19 | 15 40 24.41 | 10.444 | 19 35 31.1 | 34.52 | 16 14.07 | 69.12 | 14 21.00 | 0.585 |
| Thur. | 20 | 15 44 35.50 | 10.478 | 19 49 11.0 | 33.62 | 16 14.25 | 69.23 | 14 6.50 | 0.619 |
| Fri. | 21 | 15 48 47.41 | 10.511 | 20 2 27.3 | 32.70 | 16 14.43 | 69.34 | 13 51.20 | 0.655 |
| Sat. | 22 | 15 53 0.12 | 10.545 | 20 15 21.8 | 31.78 | 16 14.61 | 69.45 | 13 35.09 | 0.689 |
| *Sun.* | 23 | 15 57 13.63 | 10.579 | 20 27 53.7 | 30.83 | 16 14.79 | 69.55 | 13 18.18 | 0.722 |
| Mon. | 24 | 16 1 27.95 | 10.611 | 20 40 3.1 | 29.88 | 16 14.96 | 69.66 | 13 0.47 | 0.755 |
| Tues. | 25 | 16 5 43.05 | 10.642 | 20 51 49.3 | 28.91 | 16 15.12 | 69.76 | 12 41.97 | 0.788 |
| Wed. | 26 | 16 9 58.91 | 10.673 | 21 3 12.0 | 27.94 | 16 15.29 | 69.86 | 12 22.72 | 0.817 |
| Thur. | 27 | 16 14 15.47 | 10.703 | 21 14 11.1 | 26.94 | 16 15.46 | 69.96 | 12 2.77 | 0.847 |
| Fri. | 28 | 16 18 32.78 | 10.732 | 21 24 46.0 | 25.93 | 16 15.62 | 70.06 | 11 42.07 | 0.876 |
| Sat. | 29 | 16 22 50.77 | 10.760 | 21 34 56.4 | 24.90 | 16 15.78 | 70.15 | 11 20.72 | 0.904 |
| *Sun.* | 30 | 16 27 9.43 | 10.787 | 21 44 42.1 | 23.87 | 16 15.95 | 70.24 | 10 58.66 | 0.931 |
| Mon. | 31 | 16 31 28.73 | 10.814 | S.21 54 2.8 | 22.81 | 16 16.10 | 70.33 | 10 35.98 | 0.957 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | THE SUN'S Diff. for 1 hour. | THE SUN'S *Apparent* Declination. | THE SUN'S Diff. for 1 hour. | Equation of Time, *to be added to Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ″ ′ | ″ | m. s. | s. | h. m. s. |
| Sat. | 1 | 14 27 32.13 | 9.819 | S.14 35 59.7 | 47.87 | 16 17.63 | 0.038 | 14 43 49.76 |
| *Sun.* | 2 | 14 31 28.17 | 9.852 | 14 55 1.5 | 47.28 | 16 18.15 | 0.005 | 14 47 46.32 |
| Mon. | 3 | 14 35 25.01 | 9.886 | 15 13 48.7 | 46.65 | 16 17.87 | 0.029 | 14 51 42.88 |
| Tues. | 4 | 14 39 22.64 | 9.919 | 15 32 20.7 | 46.02 | 16 16.79 | 0.063 | 14 55 39.43 |
| Wed. | 5 | 14 43 21.11 | 9.952 | 15 50 37.3 | 45.35 | 16 14.88 | 0.097 | 14 59 35.99 |
| Thur. | 6 | 14 47 20.38 | 9.986 | 16 8 37.9 | 44.68 | 16 12.17 | 0.130 | 15 3 32.55 |
| Fri. | 7 | 14 51 20.46 | 10.020 | 16 26 22.1 | 43.99 | 16 8.64 | 0.164 | 15 7 29.10 |
| Sat. | 8 | 14 55 21.36 | 10.055 | 16 43 49.6 | 43.29 | 16 4.30 | 0.198 | 15 11 25.66 |
| *Sun.* | 9 | 14 59 23.09 | 10.090 | 17 1 0.0 | 42.56 | 15 59.13 | 0.233 | 15 15 22.22 |
| Mon. | 10 | 15 3 25.68 | 10.125 | 17 17 52.9 | 41.83 | 15 53.09 | 0.268 | 15 19 18.77 |
| Tues. | 11 | 15 7 29.09 | 10.160 | 17 34 28.1 | 41.08 | 15 46.24 | 0.303 | 15 23 15.33 |
| Wed. | 12 | 15 11 33.34 | 10.195 | 17 50 45.0 | 40.32 | 15 38.54 | 0.338 | 15 27 11.88 |
| Thur. | 13 | 15 15 38.42 | 10.230 | 18 6 43.3 | 39.53 | 15 30.02 | 0.373 | 15 31 8.44 |
| Fri. | 14 | 15 19 44.35 | 10.265 | 18 22 22.6 | 38.74 | 15 20.65 | 0.408 | 15 35 5.00 |
| Sat. | 15 | 15 23 51.17 | 10.301 | 18 37 42.5 | 37.92 | 15 10.38 | 0.444 | 15 39 1.55 |
| *Sun.* | 16 | 15 27 58.83 | 10.337 | 18 52 42.7 | 37.10 | 14 59.28 | 0.480 | 15 42 58.11 |
| Mon. | 17 | 15 32 7.35 | 10.373 | 19 7 22.9 | 36.26 | 14 47.32 | 0.515 | 15 46 54.67 |
| Tues. | 18 | 15 36 16.70 | 10.409 | 19 21 42.6 | 35.41 | 14 34.53 | 0.550 | 15 50 51.23 |
| Wed. | 19 | 15 40 26.91 | 10.444 | 19 35 41.4 | 34.52 | 14 20.87 | 0.585 | 15 54 47.78 |
| Thur. | 20 | 15 44 37.97 | 10.478 | 19 49 19.0 | 33.62 | 14 6.37 | 0.619 | 15 58 44.34 |
| Fri. | 21 | 15 48 49.83 | 10.511 | 20 2 35.0 | 32.70 | 13 51.07 | 0.655 | 16 2 40.90 |
| Sat. | 22 | 15 53 2.50 | 10.545 | 20 15 29.1 | 31.78 | 13 34.95 | 0.689 | 16 6 37.45 |
| *Sun.* | 23 | 15 57 15.97 | 10.579 | 20 28 0.7 | 30.83 | 13 18.04 | 0.722 | 16 10 34.01 |
| Mon. | 24 | 16 1 30.25 | 10.611 | 20 40 9.7 | 29.88 | 13 0.32 | 0.755 | 16 14 30.57 |
| Tues. | 25 | 16 5 45.31 | 10.642 | 20 51 55.5 | 28.91 | 12 41.82 | 0.788 | 16 18 27.13 |
| Wed. | 26 | 16 10 1.12 | 10.673 | 21 3 17.9 | 27.94 | 12 22.57 | 0.817 | 16 22 23.69 |
| Thur. | 27 | 16 14 17.63 | 10.703 | 21 14 16.6 | 26.94 | 12 2.62 | 0.847 | 16 26 20.25 |
| Fri. | 28 | 16 18 34.88 | 10.732 | 21 24 51.2 | 25.93 | 11 41.91 | 0.876 | 16 30 16.80 |
| Sat. | 29 | 16 22 52.79 | 10.760 | 21 35 1.2 | 24.90 | 11 20.56 | 0.904 | 16 34 13.36 |
| *Sun.* | 30 | 16 27 11.41 | 10.787 | 21 44 46.6 | 23.87 | 10 58.51 | 0.931 | 16 38 9.92 |
| Mon. | 31 | 16 31 30.65 | 10.814 | S.21 54 7.0 | 22.81 | 10 35.83 | 0.957 | 16 42 6.48 |

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 306 | 219 17 20.2 | 16 43.7 | 150.36 | —0.37 | 9.9963947 | 47.0 | 9 14 39.12 |
| 2 | 307 | 220 17 29.4 | 16 52.8 | 150.43 | 0.39 | .9962822 | 46.8 | 9 10 43.21 |
| 3 | 308 | 221 17 40.2 | 17 3.5 | 150.49 | 0.39 | .9961706 | 46.4 | 9 6 47.29 |
| 4 | 309 | 222 17 52.5 | 17 16.6 | 150.55 | 0.36 | .9960600 | 45.9 | 9 2 51.39 |
| 5 | 310 | 223 18 6.4 | 17 29.3 | 150.61 | 0.29 | .9959503 | 45.5 | 8 58 55.48 |
| 6 | 311 | 224 18 21.7 | 17 44.4 | 150.67 | 0.21 | .9958418 | 45.0 | 8 54 59.56 |
| 7 | 312 | 225 18 38.4 | 18 1.0 | 150.74 | —0.11 | .9957346 | 44.4 | 8 51 3.66 |
| 8 | 313 | 226 18 56.6 | 18 19.0 | 150.80 | +0.01 | .9956288 | 43.7 | 8 47 7.75 |
| 9 | 314 | 227 19 16.3 | 18 38.6 | 150.86 | 0.15 | .9955248 | 42.9 | 8 43 11.83 |
| 10 | 315 | 228 19 37.6 | 18 59.7 | 150.92 | 0.29 | .9954227 | 42.2 | 8 39 15.93 |
| 11 | 316 | 229 20 0.3 | 19 22.2 | 150.98 | 0.41 | .9953224 | 41.4 | 8 35 20.01 |
| 12 | 317 | 230 20 24.6 | 19 46.3 | 151.05 | 0.54 | .9952241 | 40.6 | 8 31 24.11 |
| 13 | 318 | 231 20 50.4 | 20 12.0 | 151.12 | 0.63 | .9951277 | 39.8 | 8 27 28.20 |
| 14 | 319 | 232 21 18.0 | 20 39.4 | 151.19 | 0.70 | .9950332 | 38.9 | 8 23 32.29 |
| 15 | 320 | 233 21 47.3 | 21 8.5 | 151.27 | 0.75 | .9949407 | 38.5 | 8 19 36.38 |
| 16 | 321 | 234 22 18.3 | 21 39.4 | 151.34 | 0.76 | .9948505 | 37.2 | 8 15 40.47 |
| 17 | 322 | 235 22 51.1 | 22 12.0 | 151.41 | 0.74 | .9947622 | 36.4 | 8 11 44.55 |
| 18 | 323 | 236 23 25.7 | 22 46.4 | 151.48 | 0.72 | .9946758 | 35.7 | 8 7 48.63 |
| 19 | 324 | 237 24 2.1 | 23 22.7 | 151.55 | 0.64 | .9945911 | 35.0 | 8 3 52.73 |
| 20 | 325 | 238 24 40.2 | 24 0.7 | 151.62 | 0.55 | .9945081 | 34.3 | 7 59 56.82 |
| 21 | 326 | 239 25 19.9 | 24 40.2 | 151.69 | 0.44 | .9944268 | 33.6 | 7 56 0.91 |
| 22 | 327 | 240 26 1.2 | 25 21.3 | 151.76 | 0.31 | .9943470 | 33.0 | 7 52 5.00 |
| 23 | 328 | 241 26 44.2 | 26 4.2 | 151.82 | 0.17 | .9942687 | 32.5 | 7 48 9.08 |
| 24 | 329 | 242 27 28.8 | 26 48.6 | 151.88 | +0.04 | .9941915 | 31.9 | 7 44 13.17 |
| 25 | 330 | 243 28 14.9 | 27 34.5 | 151.94 | —0.08 | .9941156 | 31.4 | 7 40 17.26 |
| 26 | 331 | 244 29 2.4 | 28 21.8 | 152.00 | 0.19 | .9940409 | 30.9 | 7 36 21.34 |
| 27 | 332 | 245 29 51.1 | 29 10.3 | 152.04 | 0.28 | .9939674 | 30.4 | 7 32 25.43 |
| 28 | 333 | 246 30 41.0 | 30 0.1 | 152.09 | 0.35 | .9938951 | 29.8 | 7 28 29.52 |
| 29 | 334 | 247 31 32.1 | 30 51.0 | 152.13 | 0.39 | .9938240 | 29.2 | 7 24 33.61 |
| 30 | 335 | 248 32 24.3 | 31 43.0 | 152.18 | 0.40 | .9937543 | 28.6 | 7 20 37.71 |
| 31 | 336 | 249 33 17.5 | 32 36.0 | 152.23 | —0.38 | 9.9936865 | 28.0 | 7 16 41.79 |

NOTE.—λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

GREENWICH MEAN TIME.

THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 15 4.6 | 15 8.6 | 55 13.1 | +1.16 | 55 27.7 | +1.27 | 2 32.3 | 2.26 | 3.6 |
| 2 | 15 13.0 | 15 17.7 | 55 43.7 | 1.38 | 56 1.0 | 1.49 | 3 26.9 | 2.33 | 4.6 |
| 3 | 15 22.7 | 15 28.1 | 56 19.6 | 1.60 | 56 39.6 | 1.70 | 4 22.4 | 2.31 | 5.6 |
| 4 | 15 33.8 | 15 39.8 | 57 0.8 | 1.80 | 57 23.0 | 1.89 | 5 17.2 | 2.26 | 6.6 |
| 5 | 15 46.1 | 15 52.7 | 57 46.1 | 1.97 | 58 10.0 | 2.03 | 6 10.5 | 2.18 | 7.6 |
| 6 | 15 59.4 | 16 6.1 | 58 34.5 | 2.06 | 58 59.0 | 2.05 | 7 2.1 | 2.09 | 8.6 |
| 7 | 16 12.6 | 16 18.8 | 59 23.0 | 1.99 | 59 45.9 | 1.87 | 7 52.0 | 2.01 | 9.6 |
| 8 | 16 24.6 | 16 29.8 | 60 7.1 | 1.70 | 60 25.9 | 1.48 | 8 41.3 | 2.03 | 10.6 |
| 9 | 16 34.2 | 16 37.6 | 60 41.8 | 1.21 | 60 54.3 | 0.90 | 9 31.2 | 2.09 | 11.6 |
| 10 | 16 39.9 | 16 41.0 | 61 2.9 | +0.55 | 61 7.2 | +0.17 | 10 23.2 | 2.21 | 12.6 |
| 11 | 16 40.9 | 16 39.6 | 61 6.9 | −0.23 | 61 1.9 | −0.62 | 11 18.6 | 2.40 | 13.6 |
| 12 | 16 37.0 | 16 33.2 | 60 52.4 | 0.99 | 60 38.6 | 1.33 | 12 17.7 | 2.57 | 14.6 |
| 13 | 16 28.3 | 16 22.6 | 60 20.8 | 1.64 | 59 59.6 | 1.91 | 13 19.8 | 2.65 | 15.6 |
| 14 | 16 16.0 | 16 8.9 | 59 35.5 | 2.13 | 59 9.2 | 2.29 | 14 22.8 | 2.65 | 16.6 |
| 15 | 16 1.3 | 15 53.5 | 58 41.4 | 2.38 | 58 12.8 | 2.41 | 15 24.4 | 2.51 | 17.6 |
| 16 | 15 45.7 | 15 38.0 | 57 44.0 | 2.40 | 57 15.6 | 2.34 | 16 21.9 | 2.26 | 18.6 |
| 17 | 15 30.5 | 15 23.4 | 56 48.2 | 2.24 | 56 22.3 | 2.11 | 17 13.8 | 2.04 | 19.6 |
| 18 | 15 16.8 | 15 10.8 | 55 58.1 | 1.95 | 55 35.9 | 1.77 | 18 0.8 | 1.85 | 20.6 |
| 19 | 15 5.4 | 15 0.6 | 55 16.0 | 1.57 | 54 58.4 | 1.36 | 18 43.9 | 1.71 | 21.6 |
| 20 | 14 56.4 | 14 52.9 | 54 43.3 | 1.16 | 54 30.6 | 0.95 | 19 24.3 | 1.62 | 22.6 |
| 21 | 14 50.1 | 14 48.0 | 54 20.4 | 0.74 | 54 12.7 | 0.54 | 20 3.2 | 1.59 | 23.6 |
| 22 | 14 46.6 | 14 45.8 | 54 7.3 | −0.35 | 54 4.2 | −0.17 | 20 41.9 | 1.61 | 24.6 |
| 23 | 14 45.5 | 14 45.8 | 54 3.2 | +0.00 | 54 4.2 | +0.16 | 21 21.6 | 1.68 | 25.6 |
| 24 | 14 46.6 | 14 47.8 | 54 7.0 | 0.31 | 54 11.5 | 0.45 | 22 3.3 | 1.78 | 26.6 |
| 25 | 14 49.4 | 14 51.4 | 54 17.6 | 0.57 | 54 25.1 | 0.67 | 22 47.9 | 1.93 | 27.6 |
| 26 | 14 53.8 | 14 56.5 | 54 33.8 | 0.76 | 54 43.6 | 0.85 | 23 36.0 | 2.09 | 28.6 |
| 27 | 14 59.5 | 15 2.7 | 54 54.3 | 0.93 | 55 5.9 | 1.00 | ☌ | | 29.6 |
| 28 | 15 6.0 | 15 9.5 | 55 18.3 | 1.06 | 55 31.3 | 1.11 | 0 27.6 | 2.28 | 0.8 |
| 29 | 15 13.2 | 15 17.1 | 55 44.9 | 1.15 | 55 59.0 | 1.19 | 1 22.2 | 2.34 | 1.8 |
| 30 | 15 21.1 | 15 25.2 | 56 13.6 | 1.23 | 56 28.7 | 1.27 | 2 18.1 | 2.35 | 2.8 |
| 31 | 15 29.4 | 15 33.7 | 56 44.2 | +1.31 | 57 0.3 | +1.34 | 3 13.6 | 2.28 | 3.8 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 1.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 10 40.67 | 2.3047 | S.27 41 35.4 | 3.868 |
| 1 | 17 12 59.07 | 2.3088 | 27 45 23.2 | 3.726 |
| 2 | 17 15 17.71 | 2.3127 | 27 49 2.5 | 3.583 |
| 3 | 17 17 36.58 | 2.3166 | 27 52 33.3 | 3.440 |
| 4 | 17 19 55.69 | 2.3205 | 27 55 55.4 | 3.297 |
| 5 | 17 22 15.03 | 2.3242 | 27 59 8.9 | 3.153 |
| 6 | 17 24 34.59 | 2.3279 | 28 2 13.7 | 3.008 |
| 7 | 17 26 54.37 | 2.3314 | 28 5 9.7 | 2.862 |
| 8 | 17 29 14.36 | 2.3349 | 28 7 57.0 | 2.716 |
| 9 | 17 31 34.56 | 2.3384 | 28 10 35.6 | 2.569 |
| 10 | 17 33 54.97 | 2.3418 | 28 13 5.1 | 2.421 |
| 11 | 17 36 15.57 | 2.3450 | 28 15 26.3 | 2.273 |
| 12 | 17 38 36.35 | 2.3480 | 28 17 38.2 | 2.123 |
| 13 | 17 40 57.32 | 2.3510 | 28 19 41.1 | 1.973 |
| 14 | 17 43 18.47 | 2.3541 | 28 21 35.0 | 1.823 |
| 15 | 17 45 39.81 | 2.3572 | 28 23 19.9 | 1.673 |
| 16 | 17 48 1.32 | 2.3599 | 28 24 55.8 | 1.522 |
| 17 | 17 50 22.99 | 2.3625 | 28 26 22.6 | 1.371 |
| 18 | 17 52 44.81 | 2.3651 | 28 27 40.3 | 1.218 |
| 19 | 17 55 6.79 | 2.3676 | 28 28 48.8 | 1.065 |
| 20 | 17 57 28.92 | 2.3700 | 28 29 48.1 | 0.912 |
| 21 | 17 59 51.19 | 2.3724 | 28 30 38.3 | 0.759 |
| 22 | 18 2 13.60 | 2.3745 | 28 31 19.2 | 0.605 |
| 23 | 18 4 36.13 | 2.3765 | S.28 31 50.8 | 0.450 |

### SUNDAY 2.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 18 6 58.78 | 2.3786 | S.28 32 13.0 | 0.294 |
| 1 | 18 9 21.55 | 2.3805 | 28 32 26.0 | 0.138 |
| 2 | 18 11 44.43 | 2.3822 | 28 32 29.6 | 0.019 |
| 3 | 18 14 7.41 | 2.3839 | 28 32 23.8 | 0.175 |
| 4 | 18 16 30.49 | 2.3855 | 28 32 8.6 | 0.331 |
| 5 | 18 18 53.66 | 2.3871 | 28 31 44.0 | 0.487 |
| 6 | 18 21 16.92 | 2.3884 | 28 31 10.1 | 0.644 |
| 7 | 18 23 40.25 | 2.3897 | 28 30 26.7 | 0.802 |
| 8 | 18 26 3.65 | 2.3908 | 28 29 33.8 | 0.960 |
| 9 | 18 28 27.13 | 2.3918 | 28 28 31.5 | 1.118 |
| 10 | 18 30 50.67 | 2.3928 | 28 27 19.7 | 1.277 |
| 11 | 18 33 14.27 | 2.3938 | 28 25 58.4 | 1.435 |
| 12 | 18 35 37.93 | 2.3946 | 28 24 27.7 | 1.593 |
| 13 | 18 38 1.64 | 2.3954 | 28 22 47.4 | 1.751 |
| 14 | 18 40 25.38 | 2.3960 | 28 20 57.6 | 1.909 |
| 15 | 18 42 49.15 | 2.3963 | 28 18 58.3 | 2.068 |
| 16 | 18 45 12.93 | 2.3966 | 28 16 49.4 | 2.227 |
| 17 | 18 47 36.72 | 2.3967 | 28 14 31.0 | 2.385 |
| 18 | 18 50 0.52 | 2.3967 | 28 12 3.2 | 2.544 |
| 19 | 18 52 24.32 | 2.3967 | 28 9 25.8 | 2.703 |
| 20 | 18 54 48.12 | 2.3968 | 28 6 38.9 | 2.862 |
| 21 | 18 57 11.92 | 2.3967 | 28 3 42.4 | 3.021 |
| 22 | 18 59 35.71 | 2.3964 | 28 0 36.4 | 3.180 |
| 23 | 19 1 59.47 | 2.3959 | 27 57 20.9 | 3.338 |
| 24 | 19 4 23.21 | 2.3954 | S.27 53 56.0 | 3.496 |

### MONDAY 3.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 19 4 23.21 | 2.3954 | S.27 53 56.0 | 3.496 |
| 1 | 19 6 46.92 | 2.3949 | 27 50 21.5 | 3.654 |
| 2 | 19 9 10.60 | 2.3943 | 27 46 37.5 | 3.812 |
| 3 | 19 11 34.23 | 2.3936 | 27 42 44.0 | 3.970 |
| 4 | 19 13 57.82 | 2.3928 | 27 38 41.0 | 4.128 |
| 5 | 19 16 21.36 | 2.3920 | 27 34 28.6 | 4.286 |
| 6 | 19 18 44.85 | 2.3911 | 27 30 6.7 | 4.444 |
| 7 | 19 21 8.28 | 2.3900 | 27 25 35.3 | 4.601 |
| 8 | 19 23 31.64 | 2.3887 | 27 20 54.5 | 4.758 |
| 9 | 19 25 54.92 | 2.3873 | 27 16 4.3 | 4.915 |
| 10 | 19 28 18.12 | 2.3861 | 27 11 4.7 | 5.072 |
| 11 | 19 30 41.24 | 2.3846 | 27 5 55.7 | 5.228 |
| 12 | 19 33 4.27 | 2.3832 | 27 0 37.4 | 5.383 |
| 13 | 19 35 27.21 | 2.3816 | 26 55 9.8 | 5.538 |
| 14 | 19 37 50.05 | 2.3798 | 26 49 32.9 | 5.693 |
| 15 | 19 40 12.78 | 2.3779 | 26 43 46.7 | 5.848 |
| 16 | 19 42 35.40 | 2.3761 | 26 37 51.2 | 6.002 |
| 17 | 19 44 57.91 | 2.3743 | 26 31 46.5 | 6.156 |
| 18 | 19 47 20.31 | 2.3723 | 26 25 32.5 | 6.310 |
| 19 | 19 49 42.58 | 2.3702 | 26 19 9.3 | 6.463 |
| 20 | 19 52 4.73 | 2.3682 | 26 12 37.0 | 6.613 |
| 21 | 19 54 26.75 | 2.3660 | 26 5 55.6 | 6.764 |
| 22 | 19 56 48.63 | 2.3638 | 25 59 5.2 | 6.916 |
| 23 | 19 59 10.38 | 2.3616 | S.25 52 5.7 | 7.067 |

### TUESDAY 4.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 20 1 32.00 | 2.3591 | S.25 44 57.1 | 7.217 |
| 1 | 20 3 53.47 | 2.3566 | 25 37 39.6 | 7.368 |
| 2 | 20 6 14.79 | 2.3540 | 25 30 13.1 | 7.518 |
| 3 | 20 8 35.97 | 2.3514 | 25 22 37.6 | 7.666 |
| 4 | 20 10 56.95 | 2.3488 | 25 14 53.2 | 7.813 |
| 5 | 20 13 17.80 | 2.3462 | 25 6 59.9 | 7.960 |
| 6 | 20 15 38.49 | 2.3435 | 24 58 57.9 | 8.107 |
| 7 | 20 17 59.02 | 2.3408 | 24 50 47.1 | 8.253 |
| 8 | 20 20 19.39 | 2.3382 | 24 42 27.6 | 8.398 |
| 9 | 20 22 39.60 | 2.3355 | 24 33 59.5 | 8.542 |
| 10 | 20 24 59.64 | 2.3326 | 24 25 22.7 | 8.685 |
| 11 | 20 27 19.50 | 2.3295 | 24 16 37.3 | 8.827 |
| 12 | 20 29 39.18 | 2.3265 | 24 7 43.4 | 8.969 |
| 13 | 20 31 58.68 | 2.3233 | 23 58 41.0 | 9.111 |
| 14 | 20 34 28.00 | 2.3211 | 23 49 30.1 | 9.252 |
| 15 | 20 36 37.16 | 2.3179 | 23 40 10.8 | 9.392 |
| 16 | 20 38 56.11 | 2.3147 | 23 30 43.1 | 9.531 |
| 17 | 20 41 14.88 | 2.3116 | 23 21 7.1 | 9.670 |
| 18 | 20 43 33.47 | 2.3084 | 23 11 22.8 | 9.807 |
| 19 | 20 45 51.88 | 2.3053 | 23 1 30.3 | 9.943 |
| 20 | 20 48 10.10 | 2.3021 | 22 51 29.6 | 10.079 |
| 21 | 20 50 28.12 | 2.2988 | 22 41 20.7 | 10.214 |
| 22 | 20 52 45.95 | 2.2956 | 22 31 3.8 | 10.348 |
| 23 | 20 55 3.59 | 2.2924 | 22 20 38.9 | 10.482 |
| 24 | 20 57 21.05 | 2.2892 | S.22 10 6.0 | 10.615 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### WEDNESDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 57 21.05 | 2.2892 | S.22 10 6.0 | 10.615 |
| 1 | 20 59 38.31 | 2.2860 | 21 59 25.2 | 10.745 |
| 2 | 21 1 55.38 | 2.2828 | 21 48 36.6 | 10.876 |
| 3 | 21 4 12.25 | 2.2796 | 21 37 40.2 | 11.004 |
| 4 | 21 6 28.93 | 2.2764 | 21 26 36.1 | 11.132 |
| 5 | 21 8 45.42 | 2.2732 | 21 15 24.3 | 11.261 |
| 6 | 21 11 1.72 | 2.2701 | 21 4 4.8 | 11.388 |
| 7. | 21 13 17.83 | 2.2669 | 20 52 37.7 | 11.513 |
| 8 | 21 15 33.75 | 2.2637 | 20 41 3.2 | 11.638 |
| 9 | 21 17 49.48 | 2.2604 | 20 29 21.2 | 11.761 |
| 10 | 21 20 5.01 | 2.2572 | 20 17 31.9 | 11.884 |
| 11 | 21 22 20.35 | 2.2542 | 20 5 35.3 | 12.006 |
| 12 | 21 24 35.51 | 2.2511 | 19 53 31.4 | 12.127 |
| 13 | 21 26 50.48 | 2.2479 | 19 41 20.2 | 12.247 |
| 14 | 21 29 5.26 | 2.2448 | 19 29 1.9 | 12.365 |
| 15 | 21 31 19.85 | 2.2416 | 19 16 36.6 | 12.482 |
| 16 | 21 33 34.25 | 2.2385 | 19 4 4.2 | 12.598 |
| 17 | 21 35 48.47 | 2.2355 | 18 51 24.9 | 12.713 |
| 18 | 21 38 2.51 | 2.2325 | 18 38 38.6 | 12.828 |
| 19 | 21 40 16.37 | 2.2295 | 18 25 45.5 | 12.941 |
| 20 | 21 42 30.05 | 2.2266 | 18 12 45.7 | 13.053 |
| 21 | 21 44 43.57 | 2.2237 | 17 49 39.2 | 13.165 |
| 22 | 21 46 56.91 | 2.2208 | 17 36 26.0 | 13.275 |
| 23 | 21 49 10.07 | 2.2179 | S.17 23 6.2 | 13.384 |

### THURSDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 21 51 23.06 | 2.2151 | S.17 19 40.0 | 13.491 |
| 1 | 21 53 35.88 | 2.2123 | 17 6 7.3 | 13.598 |
| 2 | 21 55 48.54 | 2.2095 | 16 52 28.3 | 13.704 |
| 3 | 21 58 1.03 | 2.2068 | 16 38 42.9 | 13.809 |
| 4 | 22 0 13.36 | 2.2041 | 16 24 51.3 | 13.912 |
| 5 | 22 2 25.53 | 2.2015 | 16 10 53.6 | 14.015 |
| 6 | 22 4 37.53 | 2.1989 | 15 56 49.7 | 14.116 |
| 7 | 22 6 49.39 | 2.1963 | 15 42 39.8 | 14.216 |
| 8 | 22 9 1.10 | 2.1937 | 15 28 24.0 | 14.314 |
| 9 | 22 11 12.65 | 2.1913 | 15 14 2.4 | 14.411 |
| 10 | 22 13 24.06 | 2.1890 | 14 59 34.9 | 14.507 |
| 11 | 22 15 35.33 | 2.1867 | 14 45 1.7 | 14.604 |
| 12 | 22 17 46.46 | 2.1844 | 14 30 22.9 | 14.694 |
| 13 | 22 19 57.45 | 2.1821 | 14 15 38.5 | 14.786 |
| 14 | 22 22 8.31 | 2.1800 | 14 0 48.6 | 14.877 |
| 15 | 22 24 19.05 | 2.1779 | 13 45 53.2 | 14.967 |
| 16 | 22 26 29.66 | 2.1757 | 13 30 52.6 | 15.056 |
| 17 | 22 28 40.14 | 2.1736 | 13 15 46.7 | 15.143 |
| 18 | 22 30 50.50 | 2.1717 | 13 0 35.5 | 15.229 |
| 19 | 22 33 0.75 | 2.1698 | 12 45 19.3 | 15.313 |
| 20 | 22 35 10.89 | 2.1680 | 12 29 58.0 | 15.396 |
| 21 | 22 37 20.93 | 2.1663 | 12 14 31.7 | 15.478 |
| 22 | 22 39 30.86 | 2.1646 | 11 59 0.6 | 15.559 |
| 23 | 22 41 40.69 | 2.1629 | 11 43 24.7 | 15.638 |
| 24 | 22 43 50.42 | 2.1613 | S.11 27 44.1 | 15.715 |

### FRIDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 43 50.42 | 2.1613 | S.11 27 44.1 | 15.715 |
| 1 | 22 46 0.06 | 2.1600 | 11 11 58.9 | 15.792 |
| 2 | 22 48 9.62 | 2.1587 | 10 56 9.1 | 15.868 |
| 3 | 22 50 19.10 | 2.1573 | 10 40 14.8 | 15.942 |
| 4 | 22 52 28.50 | 2.1559 | 10 24 16.1 | 16.016 |
| 5 | 22 54 37.82 | 2.1547 | 10 8 13.0 | 16.088 |
| 6 | 22 56 47.07 | 2.1536 | 9 52 5.6 | 16.158 |
| 7 | 22 58 56.26 | 2.1526 | 9 35 54.1 | 16.226 |
| 8 | 23 1 5.39 | 2.1515 | 9 19 38.6 | 16.293 |
| 9 | 23 3 14.45 | 2.1505 | 9 3 19.0 | 16.359 |
| 10 | 23 5 23.46 | 2.1497 | 8 46 55.5 | 16.425 |
| 11 | 23 7 32.43 | 2.1490 | 8 30 28.1 | 16.489 |
| 12 | 23 9 41.35 | 2.1483 | 8 13 56.9 | 16.550 |
| 13 | 23 11 50.23 | 2.1477 | 7 57 22.1 | 16.610 |
| 14 | 23 13 59.08 | 2.1472 | 7 40 43.7 | 16.669 |
| 15 | 23 16 7.90 | 2.1468 | 7 24 1.7 | 16.726 |
| 16 | 23 18 16.70 | 2.1464 | 7 7 16.4 | 16.781 |
| 17 | 23 20 25.48 | 2.1460 | 6 50 27.9 | 16.834 |
| 18 | 23 22 34.23 | 2.1458 | 6 33 36.1 | 16.887 |
| 19 | 23 24 42.98 | 2.1458 | 6 16 41.2 | 16.938 |
| 20 | 23 26 51.73 | 2.1458 | 5 59 43.4 | 16.988 |
| 21 | 23 29 0.48 | 2.1458 | 5 42 42.6 | 17.037 |
| 22 | 23 31 9.23 | 2.1458 | 5 25 39.6 | 17.085 |
| 23 | 23 33 17.98 | 2.1460 | S. 5 8 33.1 | 17.129 |

### SATURDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 23 35 26.75 | 2.1462 | S. 4 51 23.9 | 17.172 |
| 1 | 23 37 35.54 | 2.1466 | 4 34 12.3 | 17.212 |
| 2 | 23 39 44.36 | 2.1472 | 4 16 58.4 | 17.251 |
| 3 | 23 41 53.21 | 2.1478 | 3 59 42.2 | 17.289 |
| 4 | 23 44 2.10 | 2.1484 | 3 42 23.7 | 17.326 |
| 5 | 23 46 11.03 | 2.1492 | 3 25 3.0 | 17.361 |
| 6 | 23 48 20.01 | 2.1500 | 3 7 40.3 | 17.394 |
| 7 | 23 50 29.04 | 2.1509 | 2 50 15.7 | 17.425 |
| 8 | 23 52 38.13 | 2.1518 | 2 32 49.2 | 17.455 |
| 9 | 23 54 47.27 | 2.1528 | 2 15 20.8 | 17.485 |
| 10 | 23 56 56.48 | 2.1541 | 1 57 50.8 | 17.514 |
| 11 | 23 59 5.77 | 2.1556 | 1 40 19.2 | 17.541 |
| 12 | 0 1 15.15 | 2.1571 | 1 22 46.1 | 17.566 |
| 13 | 0 3 24.62 | 2.1585 | 1 5 11.7 | 17.588 |
| 14 | 0 5 34.17 | 2.1598 | 0 47 36.0 | 17.608 |
| 15 | 0 7 43.80 | 2.1612 | 0 29 59.2 | 17.626 |
| 16 | 0 9 53.53 | 2.1630 | S. 0 12 21.3 | 17.642 |
| 17 | 0 12 3.37 | 2.1649 | N. 0 5 17.6 | 17.656 |
| 18 | 0 14 13.33 | 2.1668 | 0 22 57.3 | 17.668 |
| 19 | 0 16 23.40 | 2.1688 | 0 40 37.7 | 17.679 |
| 20 | 0 18 33.59 | 2.1708 | 0 58 18.7 | 17.689 |
| 21 | 0 20 43.91 | 2.1730 | 1 16 0.3 | 17.697 |
| 22 | 0 22 54.37 | 2.1754 | 1 33 42.3 | 17.703 |
| 23 | 0 25 4.97 | 2.1778 | 1 51 24.6 | 17.707 |
| 24 | 0 27 15.71 | 2.1801 | N. 2 9 7.1 | 17.709 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### SUNDAY 9.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 0 27 15.71 | 2.1801 | N. 2 9 7.1 | 17.709 |
| 1 | 0 29 26.59 | 2.1826 | 2 26 49.7 | 17.710 |
| 2 | 0 31 37.62 | 2.1851 | 2 44 32.3 | 17.711 |
| 3 | 0 33 48.80 | 2.1876 | 3 2 14.8 | 17.708 |
| 4 | 0 36 0.13 | 2.1902 | 3 19 57.0 | 17.700 |
| 5 | 0 38 11.63 | 2.1930 | 3 37 38.8 | 17.691 |
| 6 | 0 40 23.30 | 2.1960 | 3 55 20.1 | 17.682 |
| 7 | 0 42 35.15 | 2.1989 | 4 13 0.7 | 17.671 |
| 8 | 0 44 47.18 | 2.2020 | 4 30 40.6 | 17.658 |
| 9 | 0 46 59.40 | 2.2052 | 4 48 19.7 | 17.643 |
| 10 | 0 49 11.81 | 2.2086 | 5 5 57.9 | 17.626 |
| 11 | 0 51 24.43 | 2.2120 | 5 23 34.9 | 17.607 |
| 12 | 0 53 37.26 | 2.2156 | 5 41 10.7 | 17.586 |
| 13 | 0 55 50.31 | 2.2193 | 5 58 45.2 | 17.563 |
| 14 | 0 58 3.58 | 2.2230 | 6 16 18.2 | 17.538 |
| 15 | 1 0 17.07 | 2.2267 | 6 33 49.6 | 17.511 |
| 16 | 1 2 30.78 | 2.2304 | 6 51 19.3 | 17.481 |
| 17 | 1 4 44.73 | 2.2342 | 7 8 47.2 | 17.448 |
| 18 | 1 6 58.91 | 2.2382 | 7 26 13.1 | 17.414 |
| 19 | 1 9 13.34 | 2.2424 | 7 43 36.9 | 17.379 |
| 20 | 1 11 28.01 | 2.2466 | 8 0 58.6 | 17.344 |
| 21 | 1 13 42.93 | 2.2508 | 8 18 18.1 | 17.306 |
| 22 | 1 15 58.11 | 2.2550 | 8 35 35.2 | 17.266 |
| 23 | 1 18 13.55 | 2.2593 | N. 8 52 49.8 | 17.224 |

#### MONDAY 10.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 20 29.24 | 2.2637 | N. 9 10 1.8 | 17.179 |
| 1 | 1 22 45.21 | 2.2683 | 9 27 11.0 | 17.131 |
| 2 | 1 25 1.46 | 2.2729 | 9 44 17.3 | 17.081 |
| 3 | 1 27 17.98 | 2.2777 | 10 1 20.6 | 17.028 |
| 4 | 1 29 34.79 | 2.2825 | 10 18 20.6 | 16.972 |
| 5 | 1 31 51.89 | 2.2873 | 10 35 17.2 | 16.914 |
| 6 | 1 34 9.28 | 2.2923 | 10 52 10.2 | 16.854 |
| 7 | 1 36 26.97 | 2.2973 | 11 8 59.6 | 16.793 |
| 8 | 1 38 44.96 | 2.3023 | 11 25 45.3 | 16.731 |
| 9 | 1 41 3.25 | 2.3074 | 11 42 27.2 | 16.667 |
| 10 | 1 43 21.85 | 2.3126 | 11 59 5.2 | 16.601 |
| 11 | 1 45 40.77 | 2.3178 | 12 15 39.2 | 16.532 |
| 12 | 1 48 0.00 | 2.3231 | 12 32 9.0 | 16.461 |
| 13 | 1 50 19.55 | 2.3285 | 12 48 34.5 | 16.388 |
| 14 | 1 52 39.42 | 2.3338 | 13 4 55.5 | 16.312 |
| 15 | 1 54 59.61 | 2.3392 | 13 21 12.0 | 16.234 |
| 16 | 1 57 20.13 | 2.3448 | 13 37 23.6 | 16.154 |
| 17 | 1 59 40.98 | 2.3502 | 13 53 30.3 | 16.072 |
| 18 | 2 2 2.16 | 2.3558 | 14 9 32.1 | 15.988 |
| 19 | 2 4 23.68 | 2.3614 | 14 25 28.8 | 15.901 |
| 20 | 2 6 45.54 | 2.3670 | 14 41 20.1 | 15.812 |
| 21 | 2 9 7.73 | 2.3728 | 14 57 6.0 | 15.720 |
| 22 | 2 11 30.27 | 2.3786 | 15 12 46.3 | 15.626 |
| 23 | 2 13 53.16 | 2.3844 | 15 28 20.9 | 15.530 |
| 24 | 2 16 16.40 | 2.3902 | N.15 43 49.7 | 15.432 |

#### TUESDAY 11.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 16 16.40 | 2.3902 | N.15 43 49.7 | 15.432 |
| 1 | 2 18 39.99 | 2.3962 | 15 59 12.5 | 15.332 |
| 2 | 2 21 3.94 | 2.4022 | 16 14 29.3 | 15.229 |
| 3 | 2 23 28.25 | 2.4082 | 16 29 39.9 | 15.124 |
| 4 | 2 25 52.92 | 2.4142 | 16 44 44.2 | 15.018 |
| 5 | 2 28 17.95 | 2.4202 | 16 59 42.0 | 14.909 |
| 6 | 2 30 43.34 | 2.4262 | 17 14 33.3 | 14.798 |
| 7 | 2 33 9.09 | 2.4322 | 17 29 17.8 | 14.685 |
| 8 | 2 35 35.20 | 2.4382 | 17 43 55.5 | 14.570 |
| 9 | 2 38 1.67 | 2.4442 | 17 58 26.3 | 14.453 |
| 10 | 2 40 28.50 | 2.4503 | 18 12 49.9 | 14.333 |
| 11 | 2 42 55.70 | 2.4564 | 18 27 6.2 | 14.211 |
| 12 | 2 45 23.27 | 2.4625 | 18 41 15.2 | 14.087 |
| 13 | 2 47 51.20 | 2.4685 | 18 55 16.7 | 13.961 |
| 14 | 2 50 19.49 | 2.4746 | 19 9 10.5 | 13.833 |
| 15 | 2 52 48.15 | 2.4807 | 19 22 56.6 | 13.703 |
| 16 | 2 55 17.18 | 2.4868 | 19 36 34.8 | 13.571 |
| 17 | 2 57 46.57 | 2.4928 | 19 50 5.0 | 13.437 |
| 18 | 3 0 16.32 | 2.4988 | 20 3 27.1 | 13.301 |
| 19 | 3 2 46.43 | 2.5049 | 20 16 40.9 | 13.163 |
| 20 | 3 5 16.91 | 2.5110 | 20 29 46.3 | 13.022 |
| 21 | 3 7 47.75 | 2.5171 | 20 42 43.3 | 12.879 |
| 22 | 3 10 18.95 | 2.5230 | 20 55 31.6 | 12.734 |
| 23 | 3 12 50.50 | 2.5288 | N.21 8 11.1 | 12.587 |

#### WEDNESDAY 12.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 3 15 22.39 | 2.5345 | N.21 20 41.8 | 12.438 |
| 1 | 3 17 54.63 | 2.5403 | 21 33 3.7 | 12.287 |
| 2 | 3 20 27.22 | 2.5462 | 21 45 16.4 | 12.134 |
| 3 | 3 23 0.17 | 2.5520 | 21 57 19.9 | 11.980 |
| 4 | 3 25 33.46 | 2.5576 | 22 9 14.1 | 11.825 |
| 5 | 3 28 7.08 | 2.5632 | 22 20 58.9 | 11.668 |
| 6 | 3 30 41.03 | 2.5688 | 22 32 34.3 | 11.509 |
| 7 | 3 33 15.32 | 2.5742 | 22 44 0.0 | 11.348 |
| 8 | 3 35 49.93 | 2.5794 | 22 55 16.0 | 11.186 |
| 9 | 3 38 24.85 | 2.5847 | 23 6 22.2 | 11.023 |
| 10 | 3 41 0.09 | 2.5900 | 23 17 18.5 | 10.856 |
| 11 | 3 43 35.65 | 2.5951 | 23 28 4.8 | 10.688 |
| 12 | 3 46 11.51 | 2.6002 | 23 38 41.0 | 10.518 |
| 13 | 3 48 47.68 | 2.6053 | 23 49 6.9 | 10.345 |
| 14 | 3 51 24.15 | 2.6103 | 23 59 22.4 | 10.169 |
| 15 | 3 54 0.92 | 2.6152 | 24 9 27.3 | 9.990 |
| 16 | 3 56 37.97 | 2.6199 | 24 19 21.6 | 9.818 |
| 17 | 3 59 15.30 | 2.6245 | 24 29 5.4 | 9.643 |
| 18 | 4 1 52.90 | 2.6289 | 24 38 38.5 | 9.464 |
| 19 | 4 4 30.76 | 2.6333 | 24 48 0.8 | 9.277 |
| 20 | 4 7 8.88 | 2.6377 | 24 57 12.0 | 9.096 |
| 21 | 4 9 47.26 | 2.6419 | 25 6 12.3 | 8.915 |
| 22 | 4 12 25.88 | 2.6458 | 25 15 1.7 | 8.732 |
| 23 | 4 15 4.73 | 2.6496 | 25 23 40.1 | 8.549 |
| 24 | 4 17 43.81 | 2.6533 | N.25 32 7.4 | 8.361 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| THURSDAY 13. | | | | | SATURDAY 15. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 4 17 43.81 | 2.6533 | N.25 32 7.4 | 8.361 | 0 | 6 26 18.94 | 2.6356 | N.28 26 37.6 | 1.103 |
| 1 | 4 20 23.11 | 2.6570 | 25 40 23.4 | 8.172 | 1 | 6 28 56.94 | 2.6309 | 28 25 25.7 | 1.292 |
| 2 | 4 23 2.62 | 2.6605 | 25 48 28.1 | 7.988 | 2 | 6 31 34.65 | 2.6261 | 28 24 2.6 | 1.479 |
| 3 | 4 25 42.35 | 2.6637 | 25 56 21.6 | 7.796 | 3 | 6 34 12.07 | 2.6211 | 28 22 28.3 | 1.664 |
| 4 | 4 28 22.27 | 2.6669 | 26 4 3.6 | 7.605 | 4 | 6 36 49.18 | 2.6160 | 28 20 42.9 | 1.849 |
| 5 | 4 31 2.38 | 2.6701 | 26 11 34.1 | 7.408 | 5 | 6 39 25.98 | 2.6108 | 28 18 46.4 | 2.034 |
| 6 | 4 33 42.67 | 2.6730 | 26 18 53.0 | 7.221 | 6 | 6 42 2.46 | 2.6054 | 28 16 38.9 | 2.217 |
| 7 | 4 36 23.13 | 2.6758 | 26 26 0.4 | 7.027 | 7 | 6 44 38.61 | 2.5999 | 28 14 20.4 | 2.399 |
| 8 | 4 39 3.75 | 2.6783 | 26 32 56.1 | 6.829 | 8 | 6 47 14.41 | 2.5937 | 28 11 51.0 | 2.579 |
| 9 | 4 41 44.52 | 2.6808 | 26 39 40.0 | 6.635 | 9 | 6 49 49.85 | 2.5877 | 28 9 10.9 | 2.758 |
| 10 | 4 44 25.43 | 2.6830 | 26 46 12.2 | 6.438 | 10 | 6 52 24.93 | 2.5817 | 28 6 20.1 | 2.937 |
| 11 | 4 47 6.47 | 2.6851 | 26 52 32.6 | 6.242 | 11 | 6 54 59.65 | 2.5757 | 28 3 18.6 | 3.114 |
| 12 | 4 49 47.63 | 2.6869 | 26 58 41.2 | 6.044 | 12 | 6 57 34.01 | 2.5695 | 28 0 6.5 | 3.290 |
| 13 | 4 52 28.90 | 2.6887 | 27 4 37.9 | 5.845 | 13 | 7 0 7.99 | 2.5629 | 27 56 43.9 | 3.464 |
| 14 | 4 55 10.27 | 2.6904 | 27 10 22.6 | 5.645 | 14 | 7 2 41.57 | 2.5564 | 27 53 10.9 | 3.636 |
| 15 | 4 57 51.74 | 2.6918 | 27 15 55.3 | 5.447 | 15 | 7 5 14.76 | 2.5498 | 27 49 27.6 | 3.806 |
| 16 | 5 0 33.28 | 2.6929 | 27 21 16.1 | 5.247 | 16 | 7 7 47.55 | 2.5432 | 27 45 34.1 | 3.975 |
| 17 | 5 3 14.89 | 2.6938 | 27 26 24.9 | 5.047 | 17 | 7 10 19.94 | 2.5364 | 27 41 30.5 | 4.144 |
| 18 | 5 5 56.57 | 2.6955 | 27 31 21.7 | 4.846 | 18 | 7 12 51.92 | 2.5294 | 27 37 16.8 | 4.312 |
| 19 | 5 8 38.31 | 2.6960 | 27 36 6.4 | 4.644 | 19 | 7 15 23.47 | 2.5223 | 27 32 53.2 | 4.478 |
| 20 | 5 11 20.07 | 2.6964 | 27 40 39.0 | 4.444 | 20 | 7 17 54.59 | 2.5153 | 27 28 19.7 | 4.642 |
| 21 | 5 14 1.86 | 2.6967 | 27 44 59.6 | 4.244 | 21 | 7 20 25.29 | 2.5081 | 27 23 36.4 | 4.802 |
| 22 | 5 16 43.66 | 2.6968 | 27 49 8.2 | 4.043 | 22 | 7 22 55.55 | 2.5008 | 27 18 43.5 | 4.962 |
| 23 | 5 19 25.46 | 2.6967 | N.27 53 4.7 | 3.841 | 23 | 7 25 25.37 | 2.4933 | N.27 13 41.0 | 5.121 |
| FRIDAY 14. | | | | | SUNDAY 16. | | | | |
| 0 | 5 22 7.25 | 2.6965 | N.27 56 49.1 | 3.639 | 0 | 7 27 54.74 | 2.4858 | N.27 8 28.9 | 5.279 |
| 1 | 5 24 49.02 | 2.6962 | 28 0 21.4 | 3.439 | 1 | 7 30 23.66 | 2.4783 | 27 3 7.5 | 5.435 |
| 2 | 5 27 30.77 | 2.6956 | 28 3 41.6 | 3.236 | 2 | 7 32 52.13 | 2.4708 | 26 57 36.8 | 5.589 |
| 3 | 5 30 12.48 | 2.6949 | 28 6 49.7 | 3.034 | 3 | 7 35 20.15 | 2.4631 | 26 51 56.9 | 5.742 |
| 4 | 5 32 54.14 | 2.6938 | 28 9 45.7 | 2.832 | 4 | 7 37 47.70 | 2.4552 | 26 46 7.9 | 5.893 |
| 5 | 5 35 35.73 | 2.6926 | 28 12 29.6 | 2.630 | 5 | 7 40 14.78 | 2.4474 | 26 40 9.9 | 6.043 |
| 6 | 5 38 17.24 | 2.6912 | 28 15 1.4 | 2.428 | 6 | 7 42 41.39 | 2.4396 | 26 34 2.9 | 6.191 |
| 7 | 5 40 58.66 | 2.6897 | 28 17 21.1 | 2.227 | 7 | 7 45 7.53 | 2.4317 | 26 27 47.1 | 6.337 |
| 8 | 5 43 39.98 | 2.6877 | 28 19 28.7 | 2.027 | 8 | 7 47 33.19 | 2.4237 | 26 21 22.6 | 6.481 |
| 9 | 5 46 21.18 | 2.6858 | 28 21 24.3 | 1.827 | 9 | 7 49 58.37 | 2.4157 | 26 14 49.5 | 6.624 |
| 10 | 5 49 2.26 | 2.6838 | 28 23 7.9 | 1.626 | 10 | 7 52 23.07 | 2.4076 | 26 8 7.8 | 6.765 |
| 11 | 5 51 43.22 | 2.6818 | 28 24 39.5 | 1.427 | 11 | 7 54 47.28 | 2.3994 | 26 1 17.7 | 6.904 |
| 12 | 5 54 24.05 | 2.6792 | 28 25 59.2 | 1.229 | 12 | 7 57 11.00 | 2.3912 | 25 54 19.3 | 7.043 |
| 13 | 5 57 4.72 | 2.6765 | 28 27 7.0 | 1.031 | 13 | 7 59 34.23 | 2.3830 | 25 47 12.6 | 7.180 |
| 14 | 5 59 45.23 | 2.6741 | 28 28 2.9 | 0.833 | 14 | 8 1 56.97 | 2.3748 | 25 39 57.8 | 7.315 |
| 15 | 6 2 25.58 | 2.6710 | 28 28 46.9 | 0.635 | 15 | 8 4 19.20 | 2.3666 | 25 32 34.9 | 7.448 |
| 16 | 6 5 5.74 | 2.6678 | 28 29 19.0 | 0.439 | 16 | 8 6 40.94 | 2.3584 | 25 25 4.0 | 7.579 |
| 17 | 6 7 45.70 | 2.6644 | 28 29 39.4 | 0.244 | 17 | 8 9 2.19 | 2.3502 | 25 17 25.3 | 7.709 |
| 18 | 6 10 25.45 | 2.6608 | 28 29 48.2 | 0.049 | 18 | 8 11 22.95 | 2.3419 | 25 9 38.9 | 7.837 |
| 19 | 6 13 4.97 | 2.6572 | 28 29 45.3 | 0.146 | 19 | 8 13 43.21 | 2.3336 | 25 1 44.9 | 7.964 |
| 20 | 6 15 44.26 | 2.6532 | 28 29 30.8 | 0.339 | 20 | 8 16 2.98 | 2.3253 | 24 53 43.3 | 8.089 |
| 21 | 6 18 23.32 | 2.6491 | 28 29 4.7 | 0.531 | 21 | 8 18 22.25 | 2.3170 | 24 45 34.2 | 8.212 |
| 22 | 6 21 2.13 | 2.6446 | 28 28 27.1 | 0.722 | 22 | 8 20 41.02 | 2.3087 | 24 37 17.8 | 8.333 |
| 23 | 6 23 40.67 | 2.6401 | 28 27 38.1 | 0.913 | 23 | 8 22 59.29 | 2.3005 | 24 28 54.1 | 8.453 |
| 24 | 6 26 18.94 | 2.6356 | N.28 26 37.6 | 1.103 | 24 | 8 25 17.07 | 2.2922 | N.24 20 23.4 | 8.571 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 17. | | | | | WEDNESDAY 19. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 25 17.07 | 2.2922 | N.24 20 23.4 | 8.571 | 0 | 10 6 22.36 | 1.9404 | N.15 41 6.6 | 12.540 |
| 1 | 8 27 34.35 | 2.2839 | 24 11 45.6 | 8.689 | 1 | 10 8 18.61 | 1.9347 | 15 28 32.5 | 12.591 |
| 2 | 8 29 51.13 | 2.2756 | 24 3 0.8 | 8.806 | 2 | 10 10 14.52 | 1.9291 | 15 15 55.4 | 12.642 |
| 3 | 8 32 7.42 | 2.2673 | 23 54 9.1 | 8.919 | 3 | 10 12 10.10 | 1.9235 | 15 3 15.4 | 12.692 |
| 4 | 8 34 23.21 | 2.2591 | 23 45 10.6 | 9.031 | 4 | 10 14 5.34 | 1.9179 | 14 50 32.4 | 12.741 |
| 5 | 8 36 38.51 | 2.2509 | 23 36 5.4 | 9.141 | 5 | 10 16 0.25 | 1.9123 | 14 37 46.5 | 12.790 |
| 6 | 8 38 53.31 | 2.2426 | 23 26 53.6 | 9.250 | 6 | 10 17 54.83 | 1.9069 | 14 24 57.6 | 12.837 |
| 7 | 8 41 7.62 | 2.2344 | 23 17 35.4 | 9.357 | 7 | 10 19 49.09 | 1.9017 | 14 12 6.0 | 12.882 |
| 8 | 8 43 21.44 | 2.2262 | 23 8 10.8 | 9.463 | 8 | 10 21 43.04 | 1.8965 | 13 59 11.7 | 12.927 |
| 9 | 8 45 34.77 | 2.2181 | 22 58 39.8 | 9.567 | 9 | 10 23 36.68 | 1.8915 | 13 46 14.8 | 12.971 |
| 10 | 8 47 47.62 | 2.2100 | 22 49 2.6 | 9.669 | 10 | 10 25 30.02 | 1.8865 | 13 33 15.2 | 13.014 |
| 11 | 8 49 59.98 | 2.2019 | 22 39 19.4 | 9.769 | 11 | 10 27 23.06 | 1.8816 | 13 20 13.1 | 13.056 |
| 12 | 8 52 11.85 | 2.1938 | 22 29 30.3 | 9.868 | 12 | 10 29 15.81 | 1.8767 | 13 7 8.5 | 13.097 |
| 13 | 8 54 23.24 | 2.1858 | 22 19 35.3 | 9.966 | 13 | 10 31 8.27 | 1.8719 | 12 54 1.5 | 13.137 |
| 14 | 8 56 34.15 | 2.1778 | 22 9 34.4 | 10.062 | 14 | 10 33 0.45 | 1.8672 | 12 40 52.1 | 13.177 |
| 15 | 8 58 44.59 | 2.1699 | 21 59 27.8 | 10.157 | 15 | 10 34 52.34 | 1.8626 | 12 27 40.4 | 13.213 |
| 16 | 9 0 54.55 | 2.1620 | 21 49 15.5 | 10.250 | 16 | 10 36 43.96 | 1.8580 | 12 14 26.5 | 13.249 |
| 17 | 9 3 4.03 | 2.1542 | 21 38 57.6 | 10.342 | 17 | 10 38 35.31 | 1.8534 | 12 1 10.4 | 13.290 |
| 18 | 9 5 13.04 | 2.1464 | 21 28 34.2 | 10.433 | 18 | 10 40 26.38 | 1.8488 | 11 47 52.0 | 13.323 |
| 19 | 9 7 21.59 | 2.1386 | 21 18 5.3 | 10.523 | 19 | 10 42 17.17 | 1.8443 | 11 34 31.6 | 13.356 |
| 20 | 9 9 29.67 | 2.1308 | 21 7 31.1 | 10.617 | 20 | 10 44 7.69 | 1.8400 | 11 21 9.2 | 13.392 |
| 21 | 9 11 37.28 | 2.1231 | 20 56 51.6 | 10.700 | 21 | 10 45 57.97 | 1.8360 | 11 7 44.7 | 13.421 |
| 22 | 9 13 44.43 | 2.1155 | 20 46 7.1 | 10.783 | 22 | 10 47 48.01 | 1.8320 | 10 54 18.4 | 13.455 |
| 23 | 9 15 51.13 | 2.1080 | N.20 35 17.6 | 10.866 | 23 | 10 49 37.81 | 1.8281 | N.10 40 50.2 | 13.486 |
| | TUESDAY 18. | | | | | THURSDAY 20. | | | |
| 0 | 9 17 57.39 | 2.1005 | N.20 24 23.1 | 10.948 | 0 | 10 51 27.38 | 1.8243 | N.10 27 20.2 | 13.514 |
| 1 | 9 20 3.20 | 2.0930 | 20 13 23.8 | 11.028 | 1 | 10 53 16.72 | 1.8205 | 10 13 48.5 | 13.542 |
| 2 | 9 22 8.57 | 2.0857 | 20 2 19.7 | 11.108 | 2 | 10 55 5.83 | 1.8168 | 10 0 15.1 | 13.571 |
| 3 | 9 24 13.49 | 2.0785 | 19 51 10.8 | 11.187 | 3 | 10 56 54.72 | 1.8131 | 9 46 39.9 | 13.600 |
| 4 | 9 26 17.98 | 2.0713 | 19 39 57.2 | 11.264 | 4 | 10 58 43.40 | 1.8095 | 9 33 3.1 | 13.627 |
| 5 | 9 28 22.04 | 2.0641 | 19 28 39.1 | 11.339 | 5 | 11 0 31.87 | 1.8059 | 9 19 24.7 | 13.652 |
| 6 | 9 30 25.67 | 2.0570 | 19 17 16.6 | 11.411 | 6 | 11 2 20.12 | 1.8026 | 9 5 44.8 | 13.677 |
| 7 | 9 32 28.88 | 2.0500 | 19 5 49.6 | 11.484 | 7 | 11 4 8.18 | 1.7993 | 8 52 3.4 | 13.702 |
| 8 | 9 34 31.67 | 2.0430 | 18 54 18.3 | 11.556 | 8 | 11 5 56.04 | 1.7960 | 8 38 20.5 | 13.727 |
| 9 | 9 36 34.04 | 2.0361 | 18 42 42.6 | 11.627 | 9 | 11 7 43.71 | 1.7928 | 8 24 36.1 | 13.751 |
| 10 | 9 38 36.00 | 2.0293 | 18 31 2.8 | 11.697 | 10 | 11 9 31.20 | 1.7896 | 8 10 50.4 | 13.773 |
| 11 | 9 40 37.55 | 2.0226 | 18 19 18.9 | 11.766 | 11 | 11 11 18.50 | 1.7866 | 7 57 3.4 | 13.794 |
| 12 | 9 42 38.69 | 2.0159 | 18 7 30.9 | 11.833 | 12 | 11 13 5.62 | 1.7837 | 7 43 15.1 | 13.815 |
| 13 | 9 44 39.44 | 2.0092 | 17 55 38.9 | 11.898 | 13 | 11 14 52.56 | 1.7808 | 7 29 25.6 | 13.835 |
| 14 | 9 46 39.79 | 2.0026 | 17 43 43.1 | 11.962 | 14 | 11 16 39.34 | 1.7781 | 7 15 34.9 | 13.854 |
| 15 | 9 48 39.74 | 1.9961 | 17 31 43.5 | 12.026 | 15 | 11 18 25.95 | 1.7754 | 7 1 43.1 | 13.873 |
| 16 | 9 50 39.31 | 1.9896 | 17 19 40.1 | 12.088 | 16 | 11 20 12.40 | 1.7728 | 6 47 50.2 | 13.891 |
| 17 | 9 52 38.50 | 1.9832 | 17 7 33.0 | 12.148 | 17 | 11 21 58.70 | 1.7703 | 6 33 56.3 | 13.908 |
| 18 | 9 54 37.30 | 1.9769 | 16 55 22.4 | 12.207 | 18 | 11 23 44.85 | 1.7679 | 6 20 1.3 | 13.924 |
| 19 | 9 56 35.73 | 1.9707 | 16 43 8.2 | 12.265 | 19 | 11 25 30.86 | 1.7656 | 6 6 5.4 | 13.939 |
| 20 | 9 58 33.79 | 1.9646 | 16 30 50.5 | 12.322 | 20 | 11 27 16.73 | 1.7634 | 5 52 8.6 | 13.954 |
| 21 | 10 0 31.47 | 1.9585 | 16 18 29.5 | 12.379 | 21 | 11 29 2.47 | 1.7612 | 5 38 10.9 | 13.968 |
| 22 | 10 2 28.79 | 1.9523 | 16 6 5.1 | 12.434 | 22 | 11 30 48.08 | 1.7591 | 5 24 12.4 | 13.982 |
| 23 | 10 4 25.75 | 1.9463 | 15 53 37.5 | 12.488 | 23 | 11 22 33.57 | 1.7570 | 5 10 13.1 | 13.996 |
| 24 | 10 6 22.36 | 1.9404 | N.15 41 6.6 | 12.540 | 24 | 11 34 18.93 | 1.7551 | N. 4 56 13.0 | 14.008 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 11 34 18.93 | 1.7551 | N. 4 56 13.0 | 14.008 |
| 1 | 11 36 4.18 | 1.7532 | 4 42 12.2 | 14.018 |
| 2 | 11 37 49.32 | 1.7513 | 4 28 10.8 | 14.028 |
| 3 | 11 39 34.35 | 1.7496 | 4 14 8.8 | 14.038 |
| 4 | 11 41 19.28 | 1.7481 | 4 0 6.2 | 14.048 |
| 5 | 11 43 4.12 | 1.7466 | 3 46 3.1 | 14.057 |
| 6 | 11 44 48.87 | 1.7451 | 3 31 59.4 | 14.065 |
| 7 | 11 46 33.53 | 1.7437 | 3 17 55.3 | 14.072 |
| 8 | 11 48 18.11 | 1.7424 | 3 3 50.8 | 14.078 |
| 9 | 11 50 2.61 | 1.7411 | 2 49 45.9 | 14.084 |
| 10 | 11 51 47.04 | 1.7399 | 2 35 40.6 | 14.089 |
| 11 | 11 53 31.40 | 1.7388 | 2 21 35.1 | 14.093 |
| 12 | 11 55 15.70 | 1.7378 | 2 7 29.4 | 14.097 |
| 13 | 11 56 59.94 | 1.7369 | 1 53 23.5 | 14.101 |
| 14 | 11 58 44.13 | 1.7360 | 1 39 17.4 | 14.104 |
| 15 | 12 0 28.27 | 1.7353 | 1 25 11.1 | 14.106 |
| 16 | 12 2 12.37 | 1.7347 | 1 11 4.7 | 14.107 |
| 17 | 12 3 56.43 | 1.7341 | 0 56 58.3 | 14.107 |
| 18 | 12 5 40.45 | 1.7335 | 0 42 51.9 | 14.107 |
| 19 | 12 7 24.44 | 1.7330 | 0 28 45.6 | 14.106 |
| 20 | 12 9 8.41 | 1.7327 | 0 14 39.3 | 14.104 |
| 21 | 12 10 52.36 | 1.7324 | N. 0 0 33.1 | 14.101 |
| 22 | 12 12 36.29 | 1.7321 | S. 0 13 32.9 | 14.098 |
| 23 | 12 14 20.21 | 1.7319 | S. 0 27 38.7 | 14.095 |

### SATURDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 12 16 4.11 | 1.7318 | S. 0 41 44.5 | 14.092 |
| 1 | 12 17 48.01 | 1.7317 | 0 55 50.1 | 14.088 |
| 2 | 12 19 31.92 | 1.7317 | 1 9 55.1 | 14.082 |
| 3 | 12 21 15.83 | 1.7318 | 1 23 59.7 | 14.076 |
| 4 | 12 22 59.76 | 1.7321 | 1 38 3.9 | 14.069 |
| 5 | 12 24 43.70 | 1.7325 | 1 52 7.7 | 14.061 |
| 6 | 12 26 27.68 | 1.7329 | 2 6 11.0 | 14.052 |
| 7 | 12 28 11.68 | 1.7334 | 2 20 13.8 | 14.043 |
| 8 | 12 29 55.70 | 1.7339 | 2 34 16.1 | 14.034 |
| 9 | 12 31 39.76 | 1.7344 | 2 48 17.8 | 14.025 |
| 10 | 12 33 23.84 | 1.7350 | 3 2 18.9 | 14.015 |
| 11 | 12 35 7.96 | 1.7357 | 3 16 19.4 | 14.005 |
| 12 | 12 36 52.12 | 1.7365 | 3 30 19.3 | 13.994 |
| 13 | 12 38 36.34 | 1.7375 | 3 44 18.5 | 13.983 |
| 14 | 12 40 20.62 | 1.7385 | 3 58 17.0 | 13.970 |
| 15 | 12 42 4.96 | 1.7395 | 4 12 14.6 | 13.956 |
| 16 | 12 43 49.37 | 1.7406 | 4 26 11.4 | 13.941 |
| 17 | 12 45 33.84 | 1.7417 | 4 40 7.3 | 13.926 |
| 18 | 12 47 18.38 | 1.7430 | 4 54 2.3 | 13.910 |
| 19 | 12 49 3.01 | 1.7443 | 5 7 56.3 | 13.894 |
| 20 | 12 50 47.71 | 1.7456 | 5 21 49.3 | 13.877 |
| 21 | 12 52 32.50 | 1.7470 | 5 35 41.3 | 13.860 |
| 22 | 12 54 17.37 | 1.7485 | 5 49 32.2 | 13.842 |
| 23 | 12 56 2.35 | 1.7501 | 6 3 22 0 | 13.822 |
| 24 | 12 57 47.41 | 1.7519 | S. 6 17 10.5 | 13.801 |

### SUNDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m s. | s. | ° ′ ″ | ″ |
| 0 | 12 57 47.41 | 1.7519 | S. 6 17 10.5 | 13.801 |
| 1 | 12 59 32.59 | 1.7537 | 6 30 57.6 | 13.779 |
| 2 | 13 1 17.88 | 1.7556 | 6 44 43.3 | 13.757 |
| 3 | 13 3 3.28 | 1.7574 | 6 58 27.8 | 13.735 |
| 4 | 13 4 48.80 | 1.7596 | 7 12 10.9 | 13.712 |
| 5 | 13 6 34.45 | 1.7617 | 7 25 52.5 | 13.687 |
| 6 | 13 8 20.22 | 1.7639 | 7 39 32.6 | 13.661 |
| 7 | 13 10 6.13 | 1.7662 | 7 53 11.2 | 13.636 |
| 8 | 13 11 52.18 | 1.7685 | 8 6 48.2 | 13.610 |
| 9 | 13 13 38.37 | 1.7708 | 8 20 23.8 | 13.583 |
| 10 | 13 15 24.70 | 1.7732 | 8 33 57.6 | 13.556 |
| 11 | 13 17 11.18 | 1.7757 | 8 47 29.8 | 13.527 |
| 12 | 13 18 57.80 | 1.7782 | 9 1 0.2 | 13.497 |
| 13 | 13 20 44.58 | 1.7806 | 9 14 28.9 | 13.467 |
| 14 | 13 22 31.50 | 1.7830 | 9 27 55.6 | 13.437 |
| 15 | 13 24 18.57 | 1.7856 | 9 41 20.6 | 13.406 |
| 16 | 13 26 5.80 | 1.7883 | 9 54 43.6 | 13.374 |
| 17 | 13 27 53.20 | 1.7911 | 10 8 4.8 | 13.341 |
| 18 | 13 29 40.78 | 1.7941 | 10 21 23.8 | 13.306 |
| 19 | 13 31 28.52 | 1.7973 | 10 34 40.8 | 13.270 |
| 20 | 13 33 16.46 | 1.8001 | 10 47 55.6 | 13.234 |
| 21 | 13 35 4.58 | 1.8037 | 11 1 8.5 | 13.198 |
| 22 | 13 36 52.91 | 1.8070 | 11 14 19.0 | 13.162 |
| 23 | 13 38 41.44 | 1.8103 | S.11 27 27.3 | 13.125 |

### MONDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 13 40 30.17 | 1.8136 | S.11 40 33.2 | 13.085 |
| 1 | 13 42 19.09 | 1.8171 | 11 53 36.8 | 13.045 |
| 2 | 13 44 8.23 | 1.8206 | 12 6 37.9 | 13.004 |
| 3 | 13 45 57.58 | 1.8241 | 12 19 36.7 | 12.963 |
| 4 | 13 47 47.14 | 1.8276 | 12 32 32.8 | 12.921 |
| 5 | 13 49 36.91 | 1.8311 | 12 45 26.5 | 12.878 |
| 6 | 13 51 26.88 | 1.8348 | 12 58 17.6 | 12.834 |
| 7 | 13 53 17.09 | 1.8386 | 13 11 6.1 | 12.789 |
| 8 | 13 55 7.53 | 1.8425 | 13 23 51.8 | 12.744 |
| 9 | 13 56 58.22 | 1.8463 | 13 36 34.7 | 12.697 |
| 10 | 13 58 49.13 | 1.8503 | 13 49 14.8 | 12.649 |
| 11 | 14 0 40.28 | 1.8543 | 14 1 52.0 | 12.601 |
| 12 | 14 2 31.66 | 1.8584 | 14 14 26.3 | 12.551 |
| 13 | 14 4 23.29 | 1.8627 | 14 26 57.6 | 12.501 |
| 14 | 14 6 15.19 | 1.8671 | 14 39 25.8 | 12.451 |
| 15 | 14 8 7.36 | 1.8715 | 14 51 51.0 | 12.399 |
| 16 | 14 9 59.78 | 1.8758 | 15 4 13.1 | 12.346 |
| 17 | 14 11 52.47 | 1.8801 | 15 16 31.8 | 12.291 |
| 18 | 14 13 45.41 | 1.8845 | 15 28 47.4 | 12.236 |
| 19 | 14 15 38.61 | 1.8889 | 15 40 59.6 | 12.180 |
| 20 | 14 17 32.09 | 1.8934 | 15 53 8.4 | 12.123 |
| 21 | 14 19 25.84 | 1.8979 | 16 5 13.8 | 12.066 |
| 22 | 14 21 19.86 | 1.9025 | 16 17 15.8 | 12.008 |
| 23 | 14 23 14.16 | 1.9072 | 16 29 14.2 | 11.948 |
| 24 | 14 25 8.73 | 1.9118 | S.16 41 8.9 | 11.887 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### TUESDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 25 8.73 | 1.9118 | S.16 41 8.9 | 11.887 |
| 1 | 14 27 3.58 | 1.9166 | 16 53 0.1 | 11.826 |
| 2 | 14 28 58.72 | 1.9214 | 17 4 47 6 | 11.763 |
| 3 | 14 30 54.15 | 1.9263 | 17 16 31.3 | 11.699 |
| 4 | 14 32 49.88 | 1.9314 | 17 28 11.1 | 11.634 |
| 5 | 14 34 45.91 | 1.9366 | 17 39 47.0 | 11.569 |
| 6 | 14 36 42.26 | 1.9417 | 17 51 19.0 | 11.502 |
| 7 | 14 38 38.91 | 1.9467 | 18 2 46.9 | 11.434 |
| 8 | 14 40 35.86 | 1.9517 | 18 14 10.7 | 11.365 |
| 9 | 14 42 33.11 | 1.9569 | 18 25 30.4 | 11.296 |
| 10 | 14 44 30.68 | 1.9623 | 18 36 45.7 | 11.224 |
| 11 | 14 46 28.58 | 1.9677 | 18 47 56.8 | 11.153 |
| 12 | 14 48 26.81 | 1.9730 | 18 59 3.6 | 11.081 |
| 13 | 14 50 25.35 | 1.9784 | 19 10 6.0 | 11.007 |
| 14 | 14 52 24.21 | 1.9838 | 19 21 3.8 | 10.930 |
| 15 | 14 54 23.40 | 1.9891 | 19 31 57.1 | 10.854 |
| 16 | 14 56 22.91 | 1.9943 | 19 42 45.8 | 10.777 |
| 17 | 14 58 22.73 | 1.9993 | 19 53 29.8 | 10.700 |
| 18 | 15 0 22.85 | 2.0045 | 20 4 9.2 | 10.621 |
| 19 | 15 2 23.29 | 2.0101 | 20 14 43.8 | 10.540 |
| 20 | 15 4 24.07 | 2.0160 | 20 25 13.5 | 10.457 |
| 21 | 15 6 25.20 | 2.0217 | 20 35 38.2 | 10.373 |
| 22 | 15 8 26.67 | 2.0278 | 20 45 57.9 | 10.292 |
| 23 | 15 10 28.48 | 2.0331 | S.20 56 12.6 | 10.205 |

### WEDNESDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 12 30.63 | 2.0384 | S.21 6 22.0 | 10.119 |
| 1 | 15 14 33.11 | 2.0443 | 21 16 26.3 | 10.030 |
| 2 | 15 16 35.94 | 2.0502 | 21 26 25.3 | 9.945 |
| 3 | 15 18 39.12 | 2.0558 | 21 36 19.1 | 9.856 |
| 4 | 15 20 42.64 | 2.0616 | 21 46 7.5 | 9.764 |
| 5 | 15 22 46.51 | 2.0674 | 21 55 50.4 | 9.673 |
| 6 | 15 24 50.72 | 2.0734 | 22 5 27.8 | 9.580 |
| 7 | 15 26 55.29 | 2.0790 | 22 14 59.6 | 9.488 |
| 8 | 15 29 0.20 | 2.0846 | 22 24 25.8 | 9.392 |
| 9 | 15 31 5.45 | 2.0903 | 22 33 46.2 | 9.296 |
| 10 | 15 33 11.05 | 2.0963 | 22 43 0.8 | 9.197 |
| 11 | 15 35 17.01 | 2.1024 | 22 52 9.5 | 9.101 |
| 12 | 15 37 23.32 | 2.1083 | 23 1 12.2 | 8.999 |
| 13 | 15 39 29.99 | 2.1140 | 23 10 8.9 | 8.905 |
| 14 | 15 41 37.00 | 2.1196 | 23 18 59.5 | 8.801 |
| 15 | 15 43 44.35 | 2.1253 | 23 27 43.9 | 8.696 |
| 16 | 15 45 52.05 | 2.1313 | 23 36 22.1 | 8.589 |
| 17 | 15 48 0.11 | 2.1375 | 23 44 54.0 | 8.483 |
| 18 | 15 50 8.53 | 2.1431 | 23 53 19.6 | 8.377 |
| 19 | 15 52 17.28 | 2.1487 | 24 1 38.8 | 8.270 |
| 20 | 15 54 26.38 | 2.1546 | 24 9 51.4 | 8.161 |
| 21 | 15 56 35.83 | 2.1604 | 24 17 57.5 | 8.051 |
| 22 | 15 58 45.63 | 2.1663 | 24 25 57.0 | 7.940 |
| 23 | 16 0 55.78 | 2.1720 | 24 33 49.8 | 7.827 |
| 24 | 16 3 6.27 | 2.1777 | S.24 41 35.7 | 7.714 |

### THURSDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ″ | ″ |
| 0 | 16 3 6.27 | 2.1777 | S.24 41 35.7 | 7.714 |
| 1 | 16 5 17.09 | 2.1833 | 24 49 14.9 | 7.600 |
| 2 | 16 7 28.26 | 2.1890 | 24 56 47.2 | 7.485 |
| 3 | 16 9 39.76 | 2.1944 | 25 4 12.6 | 7.369 |
| 4 | 16 11 51.61 | 2.1998 | 25 11 31.0 | 7.251 |
| 5 | 16 14 3.78 | 2.2056 | 25 18 42.3 | 7.132 |
| 6 | 16 16 16.30 | 2.2116 | 25 25 46.4 | 7.011 |
| 7 | 16 18 29.16 | 2.2170 | 25 32 43.2 | 6.890 |
| 8 | 16 20 42.34 | 2.2228 | 25 39 32.7 | 6.768 |
| 9 | 16 22 55.85 | 2.2283 | 25 46 14.9 | 6.646 |
| 10 | 16 25 9.71 | 2.2338 | 25 52 49.7 | 6.522 |
| 11 | 16 27 23.89 | 2.2393 | 25 59 17.0 | 6.396 |
| 12 | 16 29 38.40 | 2.2447 | 26 5 36.7 | 6.269 |
| 13 | 16 31 53.24 | 2.2499 | 26 11 48.8 | 6.141 |
| 14 | 16 34 8.38 | 2.2551 | 26 17 53.2 | 6.013 |
| 15 | 16 36 23.84 | 2.2603 | 26 23 49.9 | 5.883 |
| 16 | 16 38 39.60 | 2.2653 | 26 29 38.8 | 5.752 |
| 17 | 16 40 55.67 | 2.2703 | 26 35 19.8 | 5.620 |
| 18 | 16 43 12.03 | 2.2754 | 26 40 52.8 | 5.487 |
| 19 | 16 45 28.70 | 2.2803 | 26 46 17.8 | 5.354 |
| 20 | 16 47 45.65 | 2.2851 | 26 51 34.8 | 5.220 |
| 21 | 16 50 2.89 | 2.2899 | 26 56 43.8 | 5.085 |
| 22 | 16 52 20.43 | 2.2948 | 27 1 44.6 | 4.949 |
| 23 | 16 54 38.25 | 2.2997 | S.27 6 37.2 | 4.811 |

### FRIDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 16 56 56.37 | 2.3044 | S.27 11 21.5 | 4.672 |
| 1 | 16 59 14.76 | 2.3089 | 27 15 57.4 | 4.532 |
| 2 | 17 1 33.41 | 2.3133 | 27 20 24.9 | 4.391 |
| 3 | 17 3 52.33 | 2.3177 | 27 24 44.0 | 4.249 |
| 4 | 17 6 11.51 | 2.3219 | 27 28 54.5 | 4.107 |
| 5 | 17 8 30.94 | 2.3260 | 27 32 56.5 | 3.965 |
| 6 | 17 10 50.61 | 2.3300 | 27 36 50.0 | 3.822 |
| 7 | 17 13 10.52 | 2.3341 | 27 40 34.8 | 3.677 |
| 8 | 17 15 30.67 | 2.3386 | 27 44 10.9 | 3.531 |
| 9 | 17 17 51.07 | 2.3423 | 27 47 38.3 | 3.385 |
| 10 | 17 20 11.71 | 2.3460 | 27 50 56.8 | 3.239 |
| 11 | 17 22 32.57 | 2.3497 | 27 54 6.5 | 3.092 |
| 12 | 17 24 53.65 | 2.3531 | 27 57 7.3 | 2.944 |
| 13 | 17 27 14.94 | 2.3568 | 27 59 59.3 | 2.794 |
| 14 | 17 29 36.44 | 2.3603 | 28 2 42.3 | 2.644 |
| 15 | 17 31 58.14 | 2.3633 | 28 5 16.3 | 2.493 |
| 16 | 17 34 20.03 | 2.3669 | 28 7 41.1 | 2.343 |
| 17 | 17 36 42.13 | 2.3702 | 28 9 56.9 | 2.192 |
| 18 | 17 39 4.42 | 2.3733 | 28 12 3.7 | 2.040 |
| 19 | 17 41 26.89 | 2.3762 | 28 14 1.3 | 1.887 |
| 20 | 17 43 49.53 | 2.3788 | 28 15 49.7 | 1.734 |
| 21 | 17 46 12.32 | 2.3816 | 28 17 28.9 | 1.579 |
| 22 | 17 48 35.28 | 2.3842 | 28 18 58.7 | 1.424 |
| 23 | 17 50 58.39 | 2.3866 | 28 20 19.3 | 1.269 |
| 24 | 17 53 21.65 | 2.3888 | S.28 21 30.5 | 1.114 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | SATURDAY 29. | | | | | SUNDAY 30. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 17 53 21.65 | 2.3888 | S.28 21 30.5 | 1.114 | 0 | 18 51 5.00 | 2.4106 | S.28 2 34.0 | 2.703 |
| 1 | 17 55 45.03 | 2.3909 | 28 22 32.5 | 0.958 | 1 | 18 53 29.61 | 2.4100 | 27 59 47.2 | 2.864 |
| 2 | 17 58 8.54 | 2.3931 | 28 23 25.1 | 0.802 | 2 | 18 55 54.18 | 2.4094 | 27 56 50.8 | 3.024 |
| 3 | 18 0 32.17 | 2.3952 | 28 24 8.4 | 0.646 | 3 | 18 58 18.72 | 2.4086 | 27 53 44.9 | 3.184 |
| 4 | 18 2 55.93 | 2.3972 | 28 24 42.3 | 0.489 | 4 | 19 0 43.21 | 2.4077 | 27 50 29.3 | 3.343 |
| 5 | 18 5 19.81 | 2.3991 | 28 25 6.7 | 0.331 | 5 | 19 3 7.63 | 2.4067 | 27 47 4.2 | 3.501 |
| 6 | 18 7 43.79 | 2.4008 | 28 25 22.7 | 0.172 | 6 | 19 5 31.99 | 2.4057 | 27 43 29.8 | 3.659 |
| 7 | 18 10 7.87 | 2.4025 | 28 25 27.1 | 0.013 | 7 | 19 7 56.29 | 2.4045 | 27 39 45.7 | 3.817 |
| 8 | 18 12 32.04 | 2.4039 | 28 25 22.9 | 0.146 | 8 | 19 10 20.51 | 2.4032 | 27 35 52.2 | 3.976 |
| 9 | 18 14 56.30 | 2.4052 | 28 25 9.2 | 0.304 | 9 | 19 12 44.65 | 2.4018 | 27 31 49.1 | 4.134 |
| 10 | 18 17 20.63 | 2.4061 | 28 24 46.0 | 0.463 | 10 | 19 15 8.70 | 2.4004 | 27 27 36.5 | 4.292 |
| 11 | 18 19 45.00 | 2.4069 | 28 24 13.2 | 0.622 | 11 | 19 17 32.65 | 2.3986 | 27 23 14.4 | 4.449 |
| 12 | 18 22 9.43 | 2.4078 | 28 23 31.0 | 0.782 | 12 | 19 19 56.51 | 2.3970 | 27 18 43.0 | 4.606 |
| 13 | 18 24 33.90 | 2.4085 | 28 22 39.1 | 0.942 | 13 | 19 22 20.27 | 2.3962 | 27 14 2.2 | 4.762 |
| 14 | 18 26 58.42 | 2.4092 | 28 21 37.6 | 1.103 | 14 | 19 24 43.91 | 2.3932 | 27 9 12.0 | 4.918 |
| 15 | 18 29 22.97 | 2.4099 | 28 20 26.4 | 1.263 | 15 | 19 27 7.43 | 2.3912 | 27 4 12.5 | 5.074 |
| 16 | 18 31 47.58 | 2.4106 | 28 19 5.6 | 1.423 | 16 | 19 29 30.83 | 2.3892 | 26 59 3.5 | 5.229 |
| 17 | 18 34 12.23 | 2.4112 | 28 17 35.2 | 1.583 | 17 | 19 31 54.10 | 2.3870 | 26 53 45.3 | 5.383 |
| 18 | 18 36 36.91 | 2.4116 | 28 15 55.4 | 1.743 | 18 | 19 34 17.23 | 2.3847 | 26 48 17.9 | 5.537 |
| 19 | 18 39 1.59 | 2.4120 | 28 14 5.8 | 1.903 | 19 | 19 36 40.23 | 2.3824 | 26 42 41.3 | 5.690 |
| 20 | 18 41 26.29 | 2.4121 | 28 12 6.7 | 2.063 | 20 | 19 39 3.09 | 2.3800 | 26 36 55.6 | 5.843 |
| 21 | 18 43 51.00 | 2.4121 | 28 9 57.9 | 2.223 | 21 | 19 41 25.80 | 2.3774 | 26 31 0.6 | 5.996 |
| 22 | 18 46 15.70 | 2.4118 | 28 7 39.6 | 2.383 | 22 | 19 43 48.35 | 2.3748 | 26 24 56.5 | 6.148 |
| 23 | 18 48 40.37 | 2.4112 | 28 5 11.6 | 2.543 | 23 | 19 46 10.74 | 2.3721 | 26 18 43.3 | 6.299 |
| 24 | 18 51 5.00 | 2.4106 | S.28 2 34.0 | 2.703 | 24 | 19 48 32.97 | 2.3693 | S.26 12 21.0 | 6.449 |

### PHASES OF THE MOON.

| | Day. | h. | m. |
|---|---|---|---|
| ☽ First Quarter, . . . . . . . . . | 5 | 5 | 22.8 |
| ○ Full Moon, . . . . . . . . . . | 11 | 20 | 55.3 |
| ☾ Last Quarter, . . . . . . . . | 18 | 22 | 34.2 |
| ● New Moon, . . . . . . . . . . | 27 | 4 | 1.4 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . . . . . . . . . | 10 | 17.1 |
| ☾ Apogee, . . . . . . . . . . . . | 22 | 23.4 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | | | P. L. of Diff. | IIIh | | | P. L. of Diff. | VIh. | | | P. L. of Diff. | IXh. | | | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | | ° | ′ | ″ | |
| 1 | Sun | W. | 40 | 0 | 39 | 3256 | 41 | 25 | 42 | 3248 | 42 | 50 | 54 | 3238 | 44 | 16 | 18 | 3230 |
| | Venus | W. | 13 | 12 | 49 | 3463 | 14 | 33 | 55 | 3437 | 15 | 55 | 30 | 3413 | 17 | 17 | 32 | 3389 |
| | Fomalhaut | E. | 72 | 15 | 34 | 3114 | 70 | 47 | 42 | 3110 | 69 | 19 | 44 | 3108 | 67 | 51 | 44 | 3104 |
| | α Pegasi | E. | 93 | 50 | 51 | 3198 | 92 | 24 | 39 | 3188 | 90 | 58 | 16 | 3180 | 89 | 31 | 43 | 3172 |
| | Jupiter | E. | 100 | 54 | 3 | 2859 | 99 | 20 | 51 | 2850 | 97 | 47 | 28 | 2843 | 96 | 13 | 56 | 2835 |
| 2 | Sun | W. | 51 | 26 | 3 | 3180 | 53 | 52 | 36 | 3170 | 55 | 19 | 21 | 3159 | 56 | 46 | 19 | 3148 |
| | Venus | W. | 24 | 13 | 27 | 3305 | 25 | 37 | 33 | 3292 | 27 | 1 | 54 | 3279 | 28 | 26 | 30 | 3266 |
| | Fomalhaut | E. | 60 | 30 | 51 | 3095 | 59 | 2 | 35 | 3095 | 57 | 34 | 19 | 3095 | 56 | 6 | 3 | 3096 |
| | α Pegasi | E. | 82 | 16 | 34 | 3134 | 80 | 49 | 6 | 3127 | 79 | 21 | 29 | 3120 | 77 | 53 | 44 | 3114 |
| | Jupiter | E. | 88 | 23 | 31 | 2790 | 86 | 48 | 50 | 2780 | 85 | 13 | 56 | 2772 | 83 | 38 | 51 | 2761 |
| 3 | Sun | W. | 64 | 4 | 39 | 3089 | 65 | 33 | 2 | 3076 | 67 | 1 | 41 | 3063 | 68 | 30 | 36 | 3050 |
| | Venus | W. | 35 | 33 | 53 | 3190 | 37 | 0 | 14 | 3177 | 38 | 26 | 51 | 3164 | 39 | 53 | 43 | 3150 |
| | Fomalhaut | E. | 48 | 45 | 29 | 3119 | 47 | 17 | 42 | 3128 | 45 | 50 | 6 | 3139 | 44 | 22 | 44 | 3151 |
| | α Pegasi | E. | 70 | 33 | 14 | 3088 | 69 | 4 | 50 | 3085 | 67 | 36 | 22 | 3082 | 66 | 7 | 50 | 3078 |
| | Jupiter | E. | 75 | 40 | 0 | 2708 | 74 | 3 | 31 | 2697 | 72 | 26 | 47 | 2685 | 70 | 49 | 47 | 2673 |
| 4 | Sun | W. | 75 | 59 | 15 | 2981 | 77 | 29 | 51 | 2967 | 79 | 0 | 45 | 2953 | 80 | 31 | 57 | 2938 |
| | Venus | W. | 47 | 12 | 25 | 3076 | 48 | 41 | 4 | 3060 | 50 | 10 | 2 | 3046 | 51 | 39 | 18 | 3030 |
| | Mars | W. | 22 | 40 | 31 | 2947 | 24 | 11 | 50 | 2927 | 25 | 43 | 35 | 2907 | 27 | 15 | 45 | 2888 |
| | α Pegasi | E. | 58 | 44 | 38 | 3078 | 57 | 16 | 2 | 3082 | 55 | 47 | 30 | 3087 | 54 | 19 | 4 | 3093 |
| | Jupiter | E. | 62 | 40 | 42 | 2611 | 61 | 2 | 2 | 2598 | 59 | 23 | 4 | 2584 | 57 | 43 | 47 | 2571 |
| | α Arietis | E. | 99 | 10 | 46 | 2678 | 97 | 33 | 36 | 2663 | 95 | 56 | 6 | 2649 | 94 | 18 | 18 | 2635 |
| 5 | Sun | W. | 88 | 12 | 45 | 2861 | 89 | 45 | 54 | 2845 | 91 | 19 | 23 | 2829 | 92 | 53 | 13 | 2813 |
| | Venus | W. | 59 | 10 | 35 | 2950 | 60 | 41 | 51 | 2934 | 62 | 13 | 27 | 2917 | 63 | 45 | 24 | 2900 |
| | Mars | W. | 35 | 2 | 32 | 2798 | 36 | 37 | 2 | 2782 | 38 | 11 | 54 | 2763 | 39 | 47 | 10 | 2745 |
| | α Pegasi | E. | 46 | 59 | 46 | 3162 | 45 | 32 | 51 | 3185 | 44 | 6 | 24 | 3213 | 42 | 40 | 30 | 3246 |
| | Jupiter | E. | 49 | 22 | 39 | 2500 | 47 | 41 | 26 | 2486 | 45 | 59 | 53 | 2472 | 44 | 18 | 0 | 2457 |
| | α Arietis | E. | 86 | 4 | 30 | 2564 | 84 | 24 | 45 | 2550 | 82 | 44 | 41 | 2535 | 81 | 4 | 16 | 2520 |
| 6 | Sun | W. | 100 | 47 | 39 | 2732 | 102 | 23 | 37 | 2715 | 103 | 59 | 57 | 2699 | 105 | 36 | 38 | 2682 |
| | Venus | W. | 71 | 30 | 40 | 2815 | 73 | 4 | 49 | 2798 | 74 | 39 | 19 | 2782 | 76 | 14 | 11 | 2765 |
| | Mars | W. | 47 | 49 | 15 | 2660 | 49 | 26 | 49 | 2643 | 51 | 4 | 45 | 2626 | 52 | 43 | 5 | 2610 |
| | Jupiter | E. | 35 | 43 | 15 | 2381 | 33 | 59 | 13 | 2366 | 32 | 14 | 49 | 2351 | 30 | 30 | 4 | 2336 |
| | α Arietis | E. | 72 | 37 | 7 | 2448 | 70 | 54 | 41 | 2434 | 69 | 11 | 54 | 2419 | 67 | 28 | 46 | 2405 |
| | Aldebaran | E. | 103 | 10 | 31 | 2464 | 101 | 28 | 27 | 2448 | 99 | 46 | 1 | 2432 | 98 | 3 | 12 | 2416 |
| 7 | Sun | W. | 113 | 45 | 35 | 2602 | 115 | 24 | 27 | 2586 | 117 | 3 | 41 | 2570 | 118 | 43 | 17 | 2556 |
| | Venus | W. | 84 | 14 | 9 | 2680 | 85 | 51 | 16 | 2668 | 87 | 28 | 46 | 2645 | 89 | 6 | 40 | 2633 |
| | Mars | W. | 61 | 0 | 22 | 2525 | 62 | 41 | 0 | 2510 | 64 | 21 | 59 | 2495 | 66 | 3 | 19 | 2481 |
| | α Aquilæ | W. | 49 | 0 | 47 | 4008 | 50 | 12 | 19 | 3905 | 51 | 25 | 34 | 3808 | 52 | 40 | 28 | 3720 |
| | α Arietis | E. | 58 | 48 | 14 | 2338 | 57 | 3 | 10 | 2326 | 55 | 17 | 49 | 2316 | 53 | 32 | 11 | 2303 |
| | Aldebaran | E. | 89 | 23 | 31 | 2339 | 87 | 38 | 29 | 2325 | 85 | 53 | 6 | 2311 | 84 | 7 | 22 | 2297 |
| 8 | Venus | W. | 97 | 20 | 52 | 2558 | 99 | 0 | 45 | 2543 | 100 | 40 | 58 | 2531 | 102 | 21 | 28 | 2519 |
| | Mars | W. | 74 | 35 | 10 | 2408 | 76 | 18 | 34 | 2394 | 78 | 2 | 18 | 2380 | 79 | 46 | 21 | 2368 |
| | α Aquilæ | W. | 59 | 16 | 22 | 3368 | 60 | 39 | 15 | 3312 | 62 | 3 | 13 | 3260 | 63 | 28 | 11 | 3213 |
| | α Arietis | E. | 44 | 40 | 12 | 2258 | 42 | 53 | 10 | 2251 | 41 | 5 | 59 | 2247 | 39 | 18 | 41 | 2243 |
| | Aldebaran | E. | 75 | 13 | 44 | 2232 | 73 | 26 | 4 | 2221 | 71 | 38 | 8 | 2210 | 69 | 49 | 55 | 2199 |
| | Saturn | E. | 111 | 35 | 52 | 2184 | 109 | 47 | 1 | 2171 | 107 | 57 | 50 | 2159 | 106 | 8 | 20 | 2145 |
| 9 | Mars | W. | 88 | 30 | 54 | 2311 | 90 | 16 | 37 | 2302 | 92 | 2 | 34 | 2293 | 93 | 48 | 44 | 2285 |
| | α Aquilæ | W. | 70 | 45 | 52 | 3025 | 72 | 15 | 34 | 2996 | 73 | 45 | 52 | 2969 | 75 | 16 | 43 | 2945 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 45 41 52 | 3220 | 47 7 37 | 3210 | 48 33 34 | 3200 | 49 59 43 | 3191 |
| | Venus | W. | 18 40 1 | 3369 | 20 2 53 | 3351 | 21 26 6 | 3334 | 22 49 38 | 3319 |
| | Fomalhaut | E. | 66 23 39 | 3101 | 64 55 31 | 3099 | 63 27 20 | 3096 | 61 59 6 | 3096 |
| | α Pegasi | E. | 88 5 0 | 3163 | 86 38 7 | 3156 | 85 11 5 | 3148 | 83 43 54 | 3141 |
| | Jupiter | E. | 94 40 13 | 2827 | 93 6 20 | 2818 | 91 32 15 | 2809 | 89 57 59 | 2800 |
| 2 | Sun | W. | 58 13 31 | 3136 | 59 40 57 | 3124 | 61 8 37 | 3113 | 62 36 31 | 3101 |
| | Venus | W. | 29 51 21 | 3253 | 31 16 27 | 3236 | 32 41 53 | 3215 | 34 7 44 | 3200 |
| | Fomalhaut | E. | 54 37 48 | 3099 | 53 9 37 | 3101 | 51 41 29 | 3106 | 50 13 25 | 3111 |
| | α Pegasi | E. | 76 25 52 | 3109 | 74 57 53 | 3103 | 73 29 47 | 3097 | 72 1 34 | 3091 |
| | Jupiter | E. | 82 3 32 | 2751 | 80 28 0 | 2741 | 78 52 14 | 2730 | 77 16 14 | 2719 |
| 3 | Sun | W. | 69 59 47 | 3037 | 71 29 14 | 3024 | 72 58 57 | 3010 | 74 28 57 | 2996 |
| | Venus | W. | 41 20 52 | 3136 | 42 48 18 | 3121 | 44 16 2 | 3106 | 45 44 4 | 3091 |
| | Fomalhaut | E. | 42 55 36 | 3169 | 41 28 50 | 3188 | 40 2 27 | 3211 | 38 36 31 | 3234 |
| | α Pegasi | E. | 64 39 14 | 3077 | 63 10 36 | 3076 | 61 41 57 | 3075 | 60 13 17 | 3076 |
| | Jupiter | E. | 69 12 31 | 2661 | 67 34 59 | 2649 | 65 57 10 | 2637 | 64 19 5 | 2624 |
| 4 | Sun | W. | 82 3 28 | 2923 | 83 35 18 | 2908 | 85 7 27 | 2892 | 86 39 56 | 2876 |
| | Venus | W. | 53 8 54 | 3014 | 54 38 49 | 2998 | 56 9 4 | 2982 | 57 39 39 | 2965 |
| | Mars | W. | 28 48 19 | 2869 | 30 21 17 | 2851 | 31 54 39 | 2833 | 33 28 24 | 2815 |
| | α Pegasi | E. | 52 50 46 | 3101 | 51 22 38 | 3113 | 49 54 44 | 3126 | 48 27 6 | 3141 |
| | Jupiter | E. | 56 4 12 | 2556 | 54 24 19 | 2543 | 52 44 5 | 2529 | 51 3 32 | 2515 |
| | α Arietis | E. | 92 40 11 | 2621 | 91 1 45 | 2607 | 89 22 59 | 2593 | 87 43 54 | 2579 |
| 5 | Sun | W. | 94 27 24 | 2797 | 96 1 56 | 2781 | 97 36 49 | 2765 | 99 12 3 | 2748 |
| | Venus | W. | 65 17 43 | 2882 | 66 50 25 | 2866 | 68 23 28 | 2848 | 69 56 53 | 2831 |
| | Mars | W. | 41 22 50 | 2728 | 42 58 53 | 2711 | 44 35 18 | 2695 | 46 12 5 | 2678 |
| | α Pegasi | E. | 41 15 15 | 3285 | 39 50 46 | 3332 | 38 27 11 | 3386 | 37 4 39 | 3450 |
| | Jupiter | E. | 42 35 46 | 2442 | 40 53 11 | 2426 | 39 10 14 | 2411 | 37 26 55 | 2396 |
| | α Arietis | E. | 79 23 31 | 2506 | 77 42 26 | 2491 | 76 1 0 | 2477 | 74 19 14 | 2462 |
| 6 | Sun | W. | 107 13 42 | 2666 | 108 51 7 | 2649 | 110 28 55 | 2634 | 112 7 4 | 2618 |
| | Venus | W. | 77 49 25 | 2747 | 79 25 2 | 2730 | 81 1 2 | 2713 | 82 37 25 | 2697 |
| | Mars | W. | 54 21 47 | 2593 | 56 0 51 | 2577 | 57 40 18 | 2560 | 59 20 8 | 2543 |
| | Jupiter | E. | 28 44 57 | 2321 | 26 59 28 | 2305 | 25 13 36 | 2291 | 23 27 23 | 2276 |
| | α Arietis | E. | 65 45 19 | 2391 | 64 1 31 | 2378 | 62 17 25 | 2365 | 60 32 59 | 2351 |
| | Aldebaran | E. | 96 20 0 | 2401 | 94 36 26 | 2385 | 92 52 30 | 2369 | 91 8 11 | 2355 |
| 7 | Sun | W. | 120 23 13 | 2540 | 122 3 30 | 2525 | 123 44 8 | 2512 | 125 25 5 | 2497 |
| | Venus | W. | 90 44 50 | 2620 | 92 23 18 | 2604 | 94 2 8 | 2588 | 95 41 19 | 2572 |
| | Mars | W. | 67 44 59 | 2466 | 69 27 0 | 2451 | 71 9 22 | 2436 | 72 52 6 | 2422 |
| | α Aquilæ | W. | 53 56 54 | 3638 | 55 14 47 | 3562 | 56 34 3 | 3492 | 57 54 36 | 3427 |
| | α Arietis | E. | 51 46 16 | 2293 | 50 0 6 | 2283 | 48 13 41 | 2274 | 46 27 3 | 2265 |
| | Aldebaran | E. | 82 21 18 | 2283 | 80 34 53 | 2270 | 78 48 9 | 2257 | 77 1 6 | 2244 |
| 8 | Venus | W. | 104 2 15 | 2506 | 105 43 20 | 2494 | 107 24 42 | 2482 | 109 6 20 | 2471 |
| | Mars | W. | 81 30 42 | 2356 | 83 15 21 | 2344 | 85 0 16 | 2333 | 86 45 27 | 2322 |
| | α Aquilæ | W. | 64 54 5 | 3169 | 66 20 51 | 3128 | 67 48 27 | 3091 | 69 16 48 | 3056 |
| | α Arietis | E. | 37 31 18 | 2241 | 35 43 52 | 2242 | 33 56 27 | 2246 | 32 9 8 | 2249 |
| | Aldebaran | E. | 68 1 26 | 2190 | 66 12 43 | 2180 | 64 23 46 | 2172 | 62 34 38 | 2165 |
| | Saturn | E. | 104 18 30 | 2134 | 102 28 22 | 2122 | 100 37 57 | 2111 | 98 47 15 | 2101 |
| 9 | Mars | W. | 95 35 5 | 2278 | 97 21 37 | 2271 | 99 8 19 | 2264 | 100 55 11 | 2258 |
| | α Aquilæ | W. | 76 48 5 | 2924 | 78 19 53 | 2906 | 79 52 4 | 2890 | 81 24 36 | 2875 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 9 | Fomalhaut | W. | 39 59 12 | 2591 | 41 38 19 | 2545 | 43 18 29 | 2506 | 44 59 34 | 2470 |
| | Aldebaran | E. | 60 45 16 | 2158 | 58 55 46 | 2152 | 57 6 6 | 2147 | 55 16 19 | 2143 |
| | Saturn | E. | 96 56 17 | 2090 | 95 5 3 | 2081 | 93 13 35 | 2073 | 91 21 54 | 2065 |
| | Pollux | E. | 104 7 12 | 2077 | 102 15 37 | 2068 | 100 23 49 | 2059 | 98 31 47 | 2052 |
| 10 | Mars | W. | 102 42 12 | 2254 | 104 29 19 | 2249 | 106 16 33 | 2246 | 108 3 52 | 2243 |
| | α Aquilæ | W. | 82 57 27 | 2864 | 84 30 32 | 2854 | 86 3 50 | 2847 | 87 37 17 | 2842 |
| | Fomalhaut | W. | 53 36 12 | 2338 | 55 21 16 | 2320 | 57 6 46 | 2304 | 58 52 40 | 2289 |
| | α Pegasi | W. | 35 18 55 | 3078 | 36 47 32 | 2982 | 38 18 7 | 2901 | 39 50 24 | 2831 |
| | Jupiter | W. | 22 32 25 | 2006 | 24 25 50 | 2002 | 26 19 21 | 1999 | 28 12 57 | 1996 |
| | Aldebaran | E. | 46 6 32 | 2143 | 44 16 39 | 2147 | 42 26 52 | 2154 | 40 37 15 | 2163 |
| | Saturn | E. | 82 0 41 | 2034 | 80 8 0 | 2031 | 78 15 14 | 2028 | 76 22 23 | 2025 |
| | Pollux | E. | 89 8 51 | 2021 | 87 15 49 | 2017 | 85 22 41 | 2013 | 83 29 27 | 2010 |
| 11 | α Aquilæ | W. | 95 25 14 | 2850 | 96 58 37 | 2859 | 98 31 49 | 2870 | 100 4 47 | 2883 |
| | Fomalhaut | W. | 67 46 26 | 2246 | 69 33 45 | 2242 | 71 21 10 | 2239 | 73 8 39 | 2238 |
| | α Pegasi | W. | 47 51 19 | 2592 | 49 30 25 | 2562 | 51 10 12 | 2535 | 52 50 36 | 2513 |
| | Jupiter | W. | 37 41 37 | 1994 | 39 35 20 | 1996 | 41 29 0 | 1999 | 43 22 36 | 2003 |
| | Saturn | E. | 66 57 33 | 2025 | 65 4 37 | 2027 | 63 11 45 | 2031 | 61 18 59 | 2035 |
| | Pollux | E. | 74 2 38 | 2008 | 72 9 16 | 2010 | 70 15 57 | 2012 | 68 22 42 | 2016 |
| | Regulus | E. | 110 43 40 | 2015 | 108 50 29 | 2016 | 106 57 20 | 2019 | 105 4 15 | 2023 |
| 12 | Fomalhaut | W. | 82 5 54 | 2250 | 83 53 7 | 2256 | 85 40 9 | 2264 | 87 27 1 | 2272 |
| | α Pegasi | W. | 61 18 55 | 2447 | 63 1 23 | 2441 | 64 43 59 | 2437 | 66 26 41 | 2436 |
| | Jupiter | W. | 52 48 56 | 2030 | 54 41 44 | 2037 | 56 34 20 | 2046 | 58 26 43 | 2056 |
| | Saturn | E. | 51 57 12 | 2068 | 50 5 24 | 2078 | 48 13 52 | 2089 | 46 22 36 | 2101 |
| | Pollux | E. | 58 58 9 | 2043 | 57 5 42 | 2051 | 55 13 27 | 2059 | 53 21 24 | 2070 |
| | Regulus | E. | 95 40 26 | 2048 | 93 48 7 | 2056 | 91 56 0 | 2064 | 90 4 6 | 2073 |
| 13 | Fomalhaut | W. | 96 17 44 | 2331 | 98 2 59 | 2346 | 99 47 52 | 2362 | 101 32 22 | 2378 |
| | α Pegasi | W. | 74 59 54 | 2453 | 76 42 14 | 2460 | 78 24 24 | 2469 | 80 6 21 | 2480 |
| | Jupiter | W. | 67 44 45 | 2110 | 69 35 29 | 2122 | 71 25 54 | 2136 | 73 15 59 | 2150 |
| | α Arietis | W. | 31 38 51 | 2274 | 33 25 28 | 2274 | 35 12 6 | 2274 | 36 58 43 | 2278 |
| | Saturn | E. | 37 11 16 | 2175 | 35 22 11 | 2194 | 33 33 34 | 2215 | 31 45 29 | 2237 |
| | Pollux | E. | 44 5 8 | 2124 | 42 14 46 | 2137 | 40 24 43 | 2151 | 38 35 1 | 2165 |
| | Regulus | E. | 80 48 25 | 2128 | 78 58 9 | 2141 | 77 8 3 | 2155 | 75 18 37 | 2169 |
| 14 | α Pegasi | W. | 88 31 56 | 2547 | 90 12 4 | 2564 | 91 51 49 | 2581 | 93 31 10 | 2600 |
| | Jupiter | W. | 82 20 46 | 2227 | 84 8 33 | 2243 | 85 55 56 | 2260 | 87 42 54 | 2278 |
| | α Arietis | W. | 45 49 40 | 2320 | 47 35 11 | 2332 | 49 20 24 | 2344 | 51 5 19 | 2358 |
| | Aldebaran | W. | 17 11 8 | 2993 | 18 41 30 | 2881 | 20 14 13 | 2800 | 21 48 41 | 2741 |
| | Pollux | E. | 29 32 6 | 2244 | 27 44 44 | 2261 | 25 57 47 | 2279 | 24 11 17 | 2297 |
| | Regulus | E. | 66 16 7 | 2246 | 64 28 48 | 2263 | 62 51 54 | 2280 | 60 55 25 | 2297 |
| 15 | Jupiter | W. | 96 31 12 | 2368 | 98 15 32 | 2387 | 99 59 26 | 2406 | 101 42 52 | 2424 |
| | α Arietis | W. | 59 44 41 | 2435 | 61 27 26 | 2451 | 63 9 48 | 2469 | 64 51 45 | 2485 |
| | Aldebaran | W. | 29 54 40 | 2623 | 31 33 4 | 2618 | 33 11 35 | 2617 | 34 50 7 | 2620 |
| | Regulus | E. | 52 9 33 | 2389 | 50 25 43 | 2409 | 48 42 21 | 2428 | 46 59 26 | 2448 |
| | SUN | E. | 137 18 12 | 2717 | 135 41 55 | 2738 | 134 6 5 | 2756 | 132 30 41 | 2776 |
| 16 | Jupiter | W. | 110 13 22 | 2519 | 111 54 9 | 2538 | 113 34 29 | 2556 | 115 14 24 | 2575 |
| | α Arietis | W. | 73 15 26 | 2574 | 74 54 56 | 2593 | 76 34 1 | 2610 | 78 12 42 | 2629 |
| | Aldebaran | W. | 43 1 7 | 2656 | 44 38 43 | 2669 | 46 16 5 | 2681 | 47 53 10 | 2694 |
| | Regulus | E. | 38 31 49 | 2548 | 36 51 42 | 2567 | 35 12 2 | 2588 | 33 32 51 | 2609 |
| | Spica | E. | 92 28 32 | 2527 | 90 47 59 | 2548 | 89 7 52 | 2566 | 87 28 11 | 2585 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ′ | | ° ′ ″ | |
| 9 | Fomalhaut W. | 46 41 30 | 2436 | 48 24 13 | 2408 | 50 7 37 | 2382 | 51 51 37 | 2358 |
| | Aldebaran E. | 53 26 26 | 2141 | 51 36 29 | 2139 | 49 46 30 | 2139 | 47 56 30 | 2140 |
| | Saturn E. | 89 30 1 | 2067 | 87 37 56 | 2050 | 85 45 40 | 2044 | 83 53 15 | 2039 |
| | Pollux E. | 96 39 33 | 2044 | 94 47 8 | 2037 | 92 54 32 | 2031 | 91 1 46 | 2025 |
| 10 | Mars W. | 109 51 15 | 2241 | 111 38 41 | 2241 | 113 26 8 | 2241 | 115 13 35 | 2241 |
| | *a* Aquilæ W. | 89 10 51 | 2839 | 90 44 28 | 2838 | 92 18 6 | 2840 | 93 51 42 | 2843 |
| | Fomalhaut W. | 60 38 55 | 2278 | 62 25 27 | 2267 | 64 12 15 | 2258 | 65 59 16 | 2252 |
| | *a* Pegasi W. | 41 24 12 | 2769 | 42 59 21 | 2715 | 44 35 41 | 2669 | 46 13 3 | 2629 |
| | Jupiter W. | 30 6 37 | 1994 | 32 0 20 | 1993 | 33 54 6 | 1993 | 35 47 52 | 1993 |
| | Aldebaran E. | 38 47 52 | 2174 | 36 58 45 | 2188 | 35 10 0 | 2204 | 33 21 39 | 2221 |
| | Saturn E. | 74 29 27 | 2023 | 72 36 29 | 2023 | 70 43 30 | 2023 | 68 50 31 | 2023 |
| | Pollux E. | 81 36 9 | 2009 | 79 42 48 | 2008 | 77 49 26 | 2007 | 75 56 2 | 2007 |
| 11 | *a* Aquilæ W. | 101 37 28 | 2898 | 103 9 49 | 2917 | 104 41 46 | 2938 | 106 13 17 | 2958 |
| | Fomalhaut W. | 74 56 10 | 2239 | 76 43 41 | 2239 | 78 31 10 | 2242 | 80 18 35 | 2246 |
| | *a* Pegasi W. | 54 31 31 | 2494 | 56 12 52 | 2478 | 57 54 36 | 2465 | 59 36 38 | 2455 |
| | Jupiter W. | 45 16 7 | 2006 | 47 9 32 | 2011 | 49 2 49 | 2017 | 50 55 57 | 2023 |
| | Saturn E. | 59 26 19 | 2040 | 57 33 47 | 2046 | 55 41 25 | 2053 | 53 49 13 | 2060 |
| | Pollux E. | 66 29 33 | 2019 | 64 36 29 | 2025 | 62 43 33 | 2030 | 60 50 46 | 2037 |
| | Regulus E. | 103 11 15 | 2026 | 101 18 21 | 2030 | 99 25 34 | 2035 | 97 32 55 | 2042 |
| 12 | Fomalhaut W. | 89 13 41 | 2283 | 91 0 6 | 2292 | 92 46 17 | 2304 | 94 32 10 | 2317 |
| | *a* Pegasi W. | 68 9 25 | 2436 | 69 52 8 | 2438 | 71 34 49 | 2441 | 73 17 26 | 2447 |
| | Jupiter W. | 60 18 51 | 2065 | 62 10 44 | 2075 | 64 2 21 | 2086 | 65 53 42 | 2098 |
| | Saturn E. | 44 31 39 | 2113 | 42 41 0 | 2127 | 40 50 42 | 2142 | 39 0 47 | 2158 |
| | Pollux E. | 51 29 38 | 2078 | 49 38 5 | 2088 | 47 46 48 | 2100 | 45 55 49 | 2112 |
| | Regulus E. | 88 12 25 | 2083 | 86 21 0 | 2094 | 84 29 51 | 2105 | 82 38 59 | 2116 |
| 13 | Fomalhaut W. | 103 16 29 | 2396 | 105 0 10 | 2415 | 106 43 24 | 2433 | 108 26 11 | 2453 |
| | *a* Pegasi W. | 81 48 3 | 2491 | 83 29 29 | 2503 | 85 10 38 | 2517 | 86 51 27 | 2532 |
| | Jupiter W. | 75 5 42 | 2166 | 76 55 1 | 2180 | 78 43 59 | 2195 | 80 32 34 | 2210 |
| | *a* Arietis W. | 38 45 15 | 2283 | 40 31 39 | 2290 | 42 17 53 | 2299 | 44 3 54 | 2309 |
| | Saturn E. | 29 57 56 | 2261 | 28 10 59 | 2288 | 26 24 42 | 2318 | 24 39 9 | 2348 |
| | Pollux E. | 36 45 40 | 2179 | 34 56 41 | 2195 | 33 8 6 | 2210 | 31 19 54 | 2227 |
| | Regulus E. | 73 29 22 | 2183 | 71 40 29 | 2198 | 69 51 58 | 2214 | 68 3 51 | 2229 |
| 14 | *a* Pegasi W. | 95 10 5 | 2618 | 96 48 35 | 2639 | 98 26 37 | 2660 | 100 4 11 | 2681 |
| | Jupiter W. | 89 29 26 | 2296 | 91 15 32 | 2313 | 93 1 12 | 2332 | 94 46 25 | 2350 |
| | *a* Arietis W. | 52 49 54 | 2372 | 54 34 9 | 2387 | 56 18 2 | 2403 | 58 1 33 | 2419 |
| | Aldebaran W. | 23 24 27 | 2698 | 25 1 10 | 2667 | 26 38 34 | 2646 | 28 16 26 | 2630 |
| | Pollux E. | 22 25 13 | 2317 | 20 39 38 | 2337 | 18 54 32 | 2357 | 17 9 55 | 2377 |
| | Regulus E. | 59 9 21 | 2315 | 57 23 44 | 2333 | 55 38 33 | 2352 | 53 53 49 | 2371 |
| 15 | Jupiter W. | 103 25 52 | 2443 | 105 8 25 | 2462 | 106 50 31 | 2482 | 108 32 9 | 2500 |
| | *a* Arietis W. | 66 33 19 | 2503 | 68 14 28 | 2521 | 69 55 12 | 2538 | 71 35 32 | 2557 |
| | Aldebaran W. | 36 28 35 | 2624 | 38 6 58 | 2630 | 39 45 12 | 2638 | 41 23 16 | 2647 |
| | Regulus E. | 45 16 59 | 2467 | 43 34 59 | 2487 | 41 53 28 | 2507 | 40 12 24 | 2527 |
| | SUN E. | 130 55 42 | 2796 | 129 21 9 | 2816 | 127 47 2 | 2836 | 126 13 21 | 2856 |
| 16 | Jupiter W. | 116 53 53 | 2594 | 118 32 56 | 2614 | 120 11 32 | 2632 | 121 49 43 | 2652 |
| | *a* Arietis W. | 79 50 58 | 2646 | 81 28 50 | 2665 | 83 6 17 | 2682 | 84 43 21 | 2701 |
| | Aldebaran W. | 49 29 58 | 2707 | 51 6 29 | 2721 | 52 42 41 | 2735 | 54 18 35 | 2748 |
| | Regulus E. | 31 54 8 | 2629 | 30 15 53 | 2651 | 28 38 7 | 2672 | 27 0 50 | 2694 |
| | Spica E. | 85 48 56 | 2604 | 84 10 6 | 2622 | 82 31 41 | 2640 | 80 53 40 | 2658 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | III^h. | P. L. of Diff. | VI^h. | P. L. of Diff. | IX^h. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 16 | Sun | E. | 124 40 6 | 2876 | 123 7 17 | 2896 | 121 34 55 | 2917 | 120 2 58 | 2937 |
| 17 | α Arietis | W. | 86 20 0 | 2718 | 87 56 16 | 2735 | 89 32 9 | 2752 | 91 7 40 | 2769 |
| | Aldebaran | W. | 55 54 11 | 2763 | 57 29 27 | 2777 | 59 4 25 | 2792 | 60 39 4 | 2806 |
| | Saturn | W. | 19 46 52 | 2849 | 21 20 16 | 2842 | 22 53 50 | 2838 | 24 27 29 | 2832 |
| | Spica | E. | 79 16 4 | 2675 | 77 38 51 | 2693 | 76 2 2 | 2710 | 74 25 36 | 2728 |
| | Sun | E. | 112 29 25 | 3034 | 110 59 55 | 3053 | 109 30 48 | 3072 | 108 2 4 | 3091 |
| 18 | Aldebarau | W. | 68 27 38 | 2877 | 70 0 26 | 2891 | 71 32 57 | 2904 | 73 5 11 | 2917 |
| | Saturn | W. | 32 14 41 | 2868 | 33 47 41 | 2877 | 35 20 29 | 2887 | 36 53 5 | 2896 |
| | Pollux | W. | 24 21 42 | 2815 | 25 55 51 | 2829 | 27 29 41 | 2843 | 29 3 13 | 2857 |
| | Spica | E. | 66 28 56 | 2808 | 64 54 39 | 2823 | 63 20 41 | 2838 | 61 47 2 | 2852 |
| | Sun | E. | 100 43 54 | 3178 | 99 17 19 | 3193 | 97 51 2 | 3210 | 96 25 5 | 3225 |
| 19 | Aldebaran | W. | 80 42 16 | 2979 | 82 12 55 | 2989 | 83 43 21 | 3001 | 85 13 32 | 3012 |
| | Saturn | W. | 44 33 1 | 2945 | 46 4 23 | 2954 | 47 35 33 | 2963 | 49 6 32 | 2973 |
| | Pollux | W. | 36 46 37 | 2920 | 38 18 31 | 2931 | 39 50 10 | 2943 | 41 21 34 | 2954 |
| | Spica | E. | 54 3 15 | 2917 | 52 31 18 | 2930 | 50 59 37 | 2942 | 49 28 11 | 2953 |
| | Sun | E. | 89 19 46 | 3297 | 87 55 31 | 3310 | 86 31 31 | 3323 | 85 7 46 | 3336 |
| 20 | Aldebaran | W. | 92 41 18 | 3060 | 94 10 16 | 3069 | 95 39 4 | 3076 | 97 7 43 | 3084 |
| | Saturn | W. | 56 38 41 | 3014 | 58 8 37 | 3021 | 59 38 24 | 3027 | 61 8 3 | 3034 |
| | Pollux | W. | 48 55 25 | 3001 | 50 25 37 | 3009 | 51 55 39 | 3017 | 53 25 31 | 3024 |
| | Regulus | W. | 12 36 54 | 3136 | 14 4 17 | 3120 | 15 32 2 | 3110 | 17 0 0 | 3101 |
| | Spica | E. | 41 54 18 | 3001 | 40 24 7 | 3009 | 38 54 6 | 3018 | 37 24 15 | 3025 |
| | Sun | E. | 78 12 21 | 3389 | 76 49 51 | 3398 | 75 27 32 | 3407 | 74 5 23 | 3415 |
| 21 | Saturn | W. | 68 34 29 | 3060 | 70 3 28 | 3064 | 71 32 22 | 3068 | 73 1 11 | 3071 |
| | Pollux | W. | 60 52 47 | 3053 | 62 21 54 | 3058 | 63 50 55 | 3063 | 65 19 50 | 3066 |
| | Regulus | W. | 24 21 18 | 3092 | 25 49 37 | 3093 | 27 17 55 | 3093 | 28 46 13 | 3094 |
| | Spica | E. | 29 57 10 | 3057 | 28 28 8 | 3062 | 26 59 12 | 3067 | 25 30 22 | 3071 |
| | Sun | E. | 67 16 46 | 3448 | 65 55 24 | 3454 | 64 34 8 | 3459 | 63 12 58 | 3463 |
| 22 | Saturn | W. | 80 24 27 | 3082 | 81 52 59 | 3082 | 83 21 30 | 3083 | 84 50 0 | 3084 |
| | Pollux | W. | 72 43 32 | 3078 | 74 12 8 | 3080 | 75 40 42 | 3081 | 77 9 15 | 3080 |
| | Regulus | W. | 36 7 30 | 3096 | 37 35 44 | 3097 | 39 3 57 | 3096 | 40 32 11 | 3096 |
| | Sun | E. | 56 28 16 | 3480 | 55 7 29 | 3481 | 53 46 44 | 3483 | 52 26 1 | 3485 |
| 23 | Saturn | W. | 92 12 33 | 3080 | 93 41 7 | 3078 | 95 9 43 | 3077 | 96 38 21 | 3074 |
| | Pollux | W. | 84 32 4 | 3078 | 86 0 41 | 3077 | 87 29 19 | 3074 | 88 58 0 | 3072 |
| | Regulus | W. | 47 53 37 | 3089 | 49 22 0 | 3087 | 50 50 25 | 3084 | 52 18 54 | 3082 |
| | Sun | E. | 45 42 40 | 3486 | 44 22 0 | 3485 | 43 1 19 | 3484 | 41 40 37 | 3483 |
| 24 | Saturn | W. | 104 2 20 | 3060 | 105 31 19 | 3056 | 107 0 22 | 3052 | 108 29 31 | 3048 |
| | Pollux | W. | 96 22 14 | 3056 | 97 51 17 | 3053 | 99 20 24 | 3048 | 100 49 37 | 3043 |
| | Regulus | W. | 59 42 13 | 3065 | 61 11 6 | 3060 | 62 40 4 | 3056 | 64 9 8 | 3051 |
| | Sun | E. | 34 56 44 | 3476 | 33 35 52 | 3473 | 32 14 58 | 3471 | 30 54 1 | 3471 |
| 29 | Sun | W. | 21 33 15 | 3226 | 22 58 54 | 3210 | 24 24 52 | 3194 | 25 51 9 | 3186 |
| | Jupiter | E. | 90 39 0 | 2799 | 89 4 23 | 2789 | 87 29 39 | 2781 | 85 54 46 | 2772 |
| 30 | Sun | W. | 33 6 40 | 3116 | 34 34 30 | 3105 | 36 2 34 | 3094 | 37 30 50 | 3082 |
| | Fomalhaut | E. | 51 30 45 | 3085 | 50 2 17 | 3093 | 48 33 59 | 3105 | 47 5 55 | 3118 |
| | α Pegasi | E. | 73 12 44 | 3063 | 71 43 49 | 3060 | 70 14 51 | 3056 | 68 45 50 | 3058 |
| | Jupiter | E. | 77 57 25 | 2728 | 76 21 22 | 2719 | 74 45 7 | 2711 | 73 8 42 | 2706 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XV^h. | P. L. of Diff. | XVIII^h. | P. L. of Diff. | XXI^h. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 16 | Sun | E. | 118 31 26 | 2957 | 117 0 19 | 2977 | 115 29 37 | 2996 | 113 59 19 | 3015 |
| 17 | α Arietis | W. | 92 42 48 | 2796 | 94 17 34 | 2808 | 95 51 58 | 2818 | 97 26 2 | 2834 |
| | Aldebaran | W. | 62 13 24 | 2821 | 63 47 25 | 2835 | 65 21 7 | 2848 | 66 54 32 | 2863 |
| | Saturn | W. | 26 1 7 | 2841 | 27 34 42 | 2846 | 29 8 10 | 2852 | 30 41 30 | 2859 |
| | Spica | E. | 72 49 33 | 2744 | 71 13 52 | 2760 | 69 38 32 | 2777 | 68 3 34 | 2792 |
| | Sun | E. | 106 33 43 | 3109 | 105 5 44 | 3126 | 103 38 6 | 3144 | 102 10 50 | 3161 |
| 18 | Aldebaran | W. | 74 37 8 | 2931 | 76 8 48 | 2942 | 77 40 13 | 2956 | 79 11 22 | 2967 |
| | Saturn | W. | 38 25 29 | 2905 | 39 57 41 | 2915 | 41 29 41 | 2926 | 43 1 27 | 2935 |
| | Pollux | W. | 30 36 27 | 2870 | 32 9 24 | 2883 | 33 42 5 | 2896 | 35 14 29 | 2909 |
| | Spica | E. | 60 13 42 | 2866 | 58 40 39 | 2880 | 57 7 55 | 2893 | 55 35 27 | 2905 |
| | Sun | E. | 94 59 26 | 3242 | 93 34 6 | 3255 | 92 9 2 | 3270 | 90 44 16 | 3284 |
| 19 | Aldebaran | W. | 86 43 30 | 3022 | 88 13 15 | 3033 | 89 42 47 | 3042 | 91 12 8 | 3051 |
| | Saturn | W. | 50 37 19 | 2981 | 52 7 54 | 2990 | 53 38 19 | 2997 | 55 8 35 | 3005 |
| | Pollux | W. | 42 52 45 | 2961 | 44 23 43 | 2973 | 45 54 29 | 2984 | 47 25 2 | 2992 |
| | Spica | E. | 47 56 58 | 2963 | 46 25 59 | 2973 | 44 55 13 | 2983 | 43 24 39 | 2993 |
| | Sun | E. | 83 44 16 | 3347 | 82 20 59 | 3358 | 80 57 54 | 3369 | 79 35 2 | 3379 |
| 20 | Aldebaran | W. | 98 36 12 | 3091 | 100 4 32 | 3099 | 101 32 43 | 3106 | 103 0 46 | 3111 |
| | Saturn | W. | 62 37 34 | 3039 | 64 6 58 | 3045 | 65 36 15 | 3051 | 67 5 25 | 3056 |
| | Pollux | W. | 54 55 14 | 3031 | 56 24 48 | 3037 | 57 54 15 | 3043 | 59 23 34 | 3048 |
| | Regulus | W. | 18 28 8 | 3096 | 19 56 22 | 3094 | 21 24 39 | 3092 | 22 52 58 | 3091 |
| | Spica | E. | 35 54 33 | 3032 | 34 25 0 | 3039 | 32 55 36 | 3046 | 31 26 20 | 3051 |
| | Sun | E. | 72 43 23 | 3423 | 71 21 32 | 3430 | 69 59 49 | 3437 | 68 38 14 | 3443 |
| 21 | Saturn | W. | 74 29 56 | 3073 | 75 58 38 | 3077 | 77 27 16 | 3078 | 78 55 52 | 3079 |
| | Pollux | W. | 66 48 41 | 3069 | 68 17 28 | 3072 | 69 46 12 | 3074 | 71 14 53 | 3076 |
| | Regulus | W. | 30 14 30 | 3096 | 31 42 46 | 3096 | 33 11 1 | 3096 | 34 39 15 | 3096 |
| | Spica | E. | 24 1 37 | 3076 | 22 32 58 | 3079 | 21 4 23 | 3084 | 19 35 54 | 3089 |
| | Sun | E. | 61 51 53 | 3468 | 60 30 53 | 3471 | 59 9 57 | 3475 | 57 49 5 | 3478 |
| 22 | Saturn | W. | 86 18 29 | 3083 | 87 46 59 | 3083 | 89 15 29 | 3082 | 90 44 0 | 3081 |
| | Pollux | W. | 78 37 49 | 3081 | 80 6 22 | 3081 | 81 34 55 | 3080 | 83 3 29 | 3079 |
| | Regulus | W. | 42 0 25 | 3096 | 43 28 41 | 3094 | 44 56 58 | 3093 | 46 25 16 | 3091 |
| | Sun | E. | 51 5 20 | 3486 | 49 44 40 | 3485 | 48 23 59 | 3486 | 47 3 19 | 3487 |
| 23 | Saturn | W. | 98 7 2 | 3072 | 99 35 46 | 3069 | 101 4 33 | 3066 | 102 33 24 | 3062 |
| | Pollux | W. | 90 26 44 | 3069 | 91 55 31 | 3067 | 93 24 21 | 3064 | 94 53 15 | 3060 |
| | Regulus | W. | 53 47 25 | 3078 | 55 16 1 | 3076 | 56 44 40 | 3072 | 58 13 24 | 3068 |
| | Sun | E. | 40 19 54 | 3482 | 38 59 10 | 3480 | 37 38 23 | 3478 | 36 17 34 | 3477 |
| 24 | Saturn | W. | 109 58 44 | 3043 | 111 28 3 | 3039 | 112 57 27 | 3034 | 114 26 57 | 3030 |
| | Pollux | W. | 102 18 56 | 3039 | 103 48 20 | 3034 | 105 17 50 | 3030 | 106 47 26 | 3025 |
| | Regulus | W. | 65 38 18 | 3047 | 67 7 33 | 3041 | 68 36 55 | 3036 | 70 6 23 | 3031 |
| | Sun | E. | 29 33 5 | 3469 | 28 12 4 | 3468 | 26 51 4 | 3467 | 25 30 3 | 3468 |
| 29 | Sun | W. | 27 17 41 | 3166 | 28 44 33 | 3153 | 30 11 40 | 3140 | 31 39 2 | 3128 |
| | Jupiter | E. | 84 19 41 | 2763 | 82 44 25 | 2755 | 81 8 58 | 2745 | 79 33 18 | 2735 |
| 30 | Sun | W. | 38 59 21 | 3072 | 40 28 4 | 3060 | 41 57 2 | 3051 | 43 26 12 | 3039 |
| | Fomalhaut | E. | 45 38 7 | 3133 | 44 10 38 | 3151 | 42 43 30 | 3173 | 41 16 48 | 3194 |
| | α Pegasi | E. | 67 16 49 | 3058 | 65 47 48 | 3059 | 64 18 47 | 3060 | 62 49 50 | 3063 |
| | Jupiter | E. | 71 32 9 | 2699 | 69 55 27 | 2692 | 68 18 37 | 2681 | 66 41 31 | 2672 |

## AT GREENWICH APPARENT NOON.

| Day of the Week. | Day of the Month. | THE SUN'S | | | | | Sidereal Time of the Semidiameter passing the Meridian. | Equation of Time, *to be subtracted from* / *added to* *Apparent Time.* | Diff. for 1 hour. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination. | Diff. for 1 hour. | Semidiameter. | | | |
| | | h. m. s. | s. | ° ′ ″ | ″ | ′ ″ | s. | m. s. | s. |
| Mon. | 1 | 16 31 28.73 | 10.814 | S.21 54 2.8 | 22.81 | 16 16.10 | 70.33 | 10 35.98 | 0.957 |
| Tues. | 2 | 16 35 48.65 | 10.840 | 22 2 58.2 | 21.74 | 16 16.26 | 70.42 | 10 12.69 | 0.984 |
| Wed. | 3 | 16 40 9.17 | 10.865 | 22 11 27.9 | 20.67 | 16 16.40 | 70.50 | 9 48.79 | 1.008 |
| Thur. | 4 | 16 44 30.25 | 10.888 | 22 19 31.7 | 19.60 | 16 16.55 | 70.58 | 9 24.33 | 1.031 |
| Fri. | 5 | 16 48 51.88 | 10.910 | 22 27 9.5 | 18.51 | 16 16.67 | 70.67 | 8 59.33 | 1.054 |
| Sat. | 6 | 16 53 14.03 | 10.930 | 22 34 20.8 | 17.42 | 16 16.80 | 70.74 | 8 33.82 | 1.074 |
| *Sun.* | 7 | 16 57 36.67 | 10.950 | 22 41 5.7 | 16.31 | 16 16.94 | 70.81 | 8 7.81 | 1.095 |
| Mon. | 8 | 17 1 59.76 | 10.969 | 22 47 23.9 | 15.19 | 16 17.06 | 70.87 | 7 41.36 | 1.113 |
| Tues. | 9 | 17 6 23.28 | 10.987 | 22 53 15.1 | 14.05 | 16 17.18 | 70.92 | 7 14.47 | 1.130 |
| Wed. | 10 | 17 10 47.23 | 11.004 | 22 58 39.2 | 12.91 | 16 17.28 | 70.97 | 6 47.15 | 1.146 |
| Thur. | 11 | 17 15 11.60 | 11.019 | 23 3 35.9 | 11.78 | 16 17.39 | 71.02 | 6 19.43 | 1.162 |
| Fri. | 12 | 17 19 36.31 | 11.034 | 23 8 5.2 | 10.64 | 16 17.49 | 71.07 | 5 51.36 | 1.177 |
| Sat. | 13 | 17 24 1.34 | 11.048 | 23 12 7.1 | 9.49 | 16 17.59 | 71.11 | 5 22.96 | 1.190 |
| *Sun.* | 14 | 17 28 26.69 | 11.060 | 23 15 41.3 | 8.34 | 16 17.68 | 71.15 | 4 54.23 | 1.201 |
| Mon. | 15 | 17 32 52.34 | 11.071 | 23 18 47.6 | 7.17 | 16 17.75 | 71.20 | 4 25.21 | 1.212 |
| Tues. | 16 | 17 37 18.21 | 11.079 | 23 21 25.9 | 6.00 | 16 17.83 | 71.23 | 3 55.98 | 1.223 |
| Wed. | 17 | 17 41 44.30 | 11.086 | 23 23 36.2 | 4.84 | 16 17.90 | 71.26 | 3 26.53 | 1.232 |
| Thur. | 18 | 17 46 10.59 | 11.093 | 23 25 18.5 | 3.67 | 16 17.97 | 71.28 | 2 56.88 | 1.239 |
| Fri. | 19 | 17 50 37.03 | 11.099 | 23 26 32.6 | 2.48 | 16 18.03 | 71.30 | 2 27.08 | 1.244 |
| Sat. | 20 | 17 55 3.62 | 11.104 | 23 27 18.4 | 1.29 | 16 18.07 | 71.30 | 1 57.14 | 1.249 |
| *Sun.* | 21 | 17 59 30.27 | 11.108 | 23 27 35.8 | 0.12 | 16 18.12 | 71.31 | 1 27.12 | 1.253 |
| Mon. | 22 | 18 3 56.99 | 11.109 | 23 27 24.9 | 1.04 | 16 18.17 | 71.31 | 0 57.05 | 1.255 |
| Tues. | 23 | 18 8 23.71 | 11.108 | 23 26 45.7 | 2.22 | 16 18.21 | 71.31 | 0 26.97 | 1.255 |
| Wed. | 24 | 18 12 50.42 | 11.106 | 23 25 38.1 | 3.40 | 16 18.24 | 71.29 | 0 3.10 | 1.254 |
| Thur. | 25 | 18 17 17.07 | 11.108 | 23 24 2.2 | 4.57 | 16 18.27 | 71.28 | 0 33.09 | 1.251 |
| Fri. | 26 | 18 21 43.62 | 11.099 | 23 21 57.9 | 5.75 | 16 18.30 | 71.27 | 1 2.98 | 1.243 |
| Sat. | 27 | 18 26 10.02 | 11.093 | 23 19 25.4 | 6.93 | 16 18.33 | 71.25 | 1 32.72 | 1.236 |
| *Sun.* | 28 | 18 30 36.24 | 11.085 | 23 16 24.8 | 8.11 | 16 18.35 | 71.23 | 2 2.36 | 1.227 |
| Mon. | 29 | 18 35 2.25 | 11.075 | 23 12 56.3 | 9.27 | 16 18.37 | 71.19 | 2 31.73 | 1.216 |
| Tues. | 30 | 18 39 28.02 | 11.063 | 23 8 59.7 | 10.43 | 16 18.38 | 71.16 | 3 0.86 | 1.204 |
| Wed. | 31 | 18 43 53.47 | 11.050 | 23 4 35.3 | 11.58 | 16 18.38 | 71.11 | 3 29.68 | 1.192 |
| Thur. | 32 | 18 48 18.59 | 11.035 | S.22 59 43.2 | 12.73 | 16 18.38 | 71.07 | 3 58.16 | 1.178 |

NOTE. — *Mean* Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

| Day of the Week. | Day of the Month. | THE SUN'S *Apparent* Right Ascension. | Diff. for 1 hour. | *Apparent* Declination | Diff. for 1 hour. | Equation of Time, *to be added to* / *subtracted from* *Mean Time.* | Diff. for 1 hour. | Sidereal Time. |
|---|---|---|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ″ ′ | ″ | m. s. | s. | h. m. s. |
| Mon. | 1 | 16 31 30.65 | 10.814 | S.21 54 7.0 | 22.81 | 10 35.83 | 0.957 | 16 42 6.48 |
| Tues. | 2 | 16 35 50.50 | 10.840 | 22 3 2.0 | 21.74 | 10 12.54 | 0.984 | 16 46 3.04 |
| Wed. | 3 | 16 40 10.95 | 10.865 | 22 11 31.4 | 20.67 | 9 48.65 | 1.008 | 16 49 59.60 |
| Thur. | 4 | 16 44 31.96 | 10.888 | 22 19 34.9 | 19.60 | 9 24.19 | 1.031 | 16 53 56.15 |
| Fri. | 5 | 16 48 53.52 | 10.910 | 22 27 12.4 | 18.51 | 8 59.19 | 1.054 | 16 57 52.71 |
| Sat. | 6 | 16 53 15.59 | 10.930 | 22 34 23.5 | 17.42 | 8 33.68 | 1.074 | 17 1 49.27 |
| *Sun.* | 7 | 16 57 38.15 | 10.950 | 22 41 8.1 | 16.31 | 8 7.68 | 1.095 | 17 5 45.83 |
| Mon. | 8 | 17 2 1.16 | 10.969 | 22 47 26.0 | 15.19 | 7 41.23 | 1.113 | 17 9 42.39 |
| Tues. | 9 | 17 6 24.60 | 10.987 | 22 53 16.9 | 14.05 | 7 14.35 | 1.130 | 17 13 38.95 |
| Wed. | 10 | 17 10 48.47 | 11.004 | 22 58 40.8 | 12.91 | 6 47.04 | 1.146 | 17 17 35.51 |
| Thur. | 11 | 17 15 12.74 | 11.019 | 23 3 37.3 | 11.78 | 6 19.32 | 1.162 | 17 21 32.06 |
| Fri. | 12 | 17 19 37.36 | 11.034 | 23 8 6.4 | 10.64 | 5 51.26 | 1.177 | 17 25 28.62 |
| Sat. | 13 | 17 24 2.31 | 11.048 | 23 12 8.1 | 9.49 | 5 22.87 | 1.190 | 17 29 25.18 |
| *Sun.* | 14 | 17 28 27.59 | 11.060 | 23 15 42.1 | 8.34 | 4 54.15 | 1.201 | 17 33 21.74 |
| Mon. | 15 | 17 32 53.16 | 11.071 | 23 18 48.2 | 7.17 | 4 25.14 | 1.212 | 17 37 18.30 |
| Tues. | 16 | 17 37 18.94 | 11.079 | 23 21 26.4 | 6.00 | 3 55.92 | 1.223 | 17 41 14.86 |
| Wed. | 17 | 17 41 44.94 | 11.086 | 23 23 36.6 | 4.84 | 3 26.48 | 1.232 | 17 45 11.42 |
| Thur. | 18 | 17 46 11.14 | 11.093 | 23 25 18.8 | 3.67 | 2 56.84 | 1.239 | 17 49 7.98 |
| Fri. | 19 | 17 50 37.49 | 11.099 | 23 26 32.8 | 2.48 | 2 27.05 | 1.244 | 17 53 4.54 |
| Sat. | 20 | 17 55 3.98 | 11.104 | 23 27 18.5 | 1.29 | 1 57.12 | 1.249 | 17 57 1.10 |
| *Sun.* | 21 | 17 59 30.54 | 11.108 | 23 27 35.9 | 0.12 | 1 27.11 | 1.253 | 18 0 57.65 |
| Mon. | 22 | 18 3 57.16 | 11.109 | 23 27 25.0 | 1.04 | 0 57.05 | 1.255 | 18 4 54.21 |
| Tues. | 23 | 18 8 23.79 | 11.108 | 23 26 45.7 | 2.22 | 0 26.98 | 1.255 | 18 8 50.77 |
| Wed. | 24 | 18 12 50.41 | 11.106 | 23 25 38.1 | 3.40 | 0 3.08 | 1.254 | 18 12 47.33 |
| Thur. | 25 | 18 17 16.97 | 11.103 | 23 24 2.2 | 4.57 | 0 33.08 | 1.251 | 18 16 43.89 |
| Fri. | 26 | 18 21 43.43 | 11.099 | 23 21 58.0 | 5.75 | 1 2.98 | 1.243 | 18 20 40.45 |
| Sat. | 27 | 18 26 9.74 | 11.093 | 23 19 25.6 | 6.93 | 1 32.73 | 1.236 | 18 24 37.01 |
| *Sun.* | 28 | 18 30 35.87 | 11.085 | 23 16 25.1 | 8.11 | 2 2.30 | 1.227 | 18 28 33.57 |
| Mon. | 29 | 18 35 1.79 | 11.075 | 23 12 56.6 | 9.27 | 2 31.66 | 1.216 | 18 32 30.13 |
| Tues. | 30 | 18 39 27.47 | 11.063 | 23 9 0.1 | 10.43 | 3 0.78 | 1.204 | 18 36 26.69 |
| Wed. | 31 | 18 43 52.85 | 11.050 | 23 4 35.7 | 11.58 | 3 29.59 | 1.192 | 18 40 23.24 |
| Thur. | 32 | 18 48 17.90 | 11.035 | S.22 59 43.7 | 12.73 | 3 58.08 | 1.178 | 18 44 19.80 |

**Note.**—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

| Day of the Month. | Day of the Year. | THE SUN'S | | | | Logarithm of the Radius Vector of the Earth. | Diff. for 1 hour. | Mean Time of Sidereal 0h. |
|---|---|---|---|---|---|---|---|---|
| | | *True* LONGITUDE. | | Diff. for 1 hour. | LATITUDE. | | | |
| | | λ | λ′ | | | | | |
| | | ° ′ ″ | ′ ″ | ″ | ″ | | | h. m. s. |
| 1 | 336 | 249 33 17.5 | 32 36.0 | 152.23 | —0.38 | 9.9936861 | 28.0 | 7 16 41.79 |
| 2 | 337 | 250 34 11.6 | 33 29.9 | 152.26 | 0.32 | .9936195 | 27.3 | 7 12 45.86 |
| 3 | 338 | 251 35 6.4 | 34 24.5 | 152.30 | 0.25 | .9935544 | 26.5 | 7 8 49.96 |
| 4 | 339 | 252 36 1.9 | 35 19.8 | 152.33 | 0.15 | .9934912 | 25.7 | 7 4 54.05 |
| 5 | 340 | 253 36 58.2 | 36 15.9 | 152.36 | —0.02 | .9934298 | 24.9 | 7 0 58.14 |
| 6 | 341 | 254 37 55.2 | 37 12.7 | 152.39 | +0.11 | .9933705 | 24.2 | 6 57 2.22 |
| 7 | 342 | 255 38 52.8 | 38 10.1 | 152.41 | 0.24 | .9933135 | 23.1 | 6 53 6.31 |
| 8 | 343 | 256 39 51.0 | 39 8.2 | 152.44 | 0.36 | .9932587 | 22.0 | 6 49 10.39 |
| 9 | 344 | 257 40 49.9 | 40 6.9 | 152.46 | 0.48 | .9932065 | 21.0 | 6 45 14.48 |
| 10 | 345 | 258 41 49.6 | 41 6.4 | 152.49 | 0.59 | .9931570 | 20.0 | 6 41 18.57 |
| 11 | 346 | 259 42 50.0 | 42 6.6 | 152.52 | 0.67 | .9931102 | 19.0 | 6 37 22.66 |
| 12 | 347 | 260 43 51.0 | 43 7.4 | 152.56 | 0.73 | .9930658 | 17.9 | 6 33 26.75 |
| 13 | 348 | 261 44 52.7 | 44 8.9 | 152.59 | 0.75 | .9930243 | 16.8 | 6 29 30.83 |
| 14 | 349 | 262 45 55.3 | 45 11.3 | 152.62 | 0.74 | .9929856 | 15.7 | 6 25 34.92 |
| 15 | 350 | 263 46 58.7 | 46 14.5 | 152.66 | 0.71 | .9929494 | 14.6 | 6 21 39.01 |
| 16 | 351 | 264 48 2.7 | 47 18.3 | 152.69 | 0.63 | .9929159 | 13.5 | 6 17 43.09 |
| 17 | 352 | 265 49 7.6 | 48 23.0 | 152.72 | 0.54 | .9928848 | 12.5 | 6 13 47.17 |
| 18 | 353 | 266 50 13.4 | 49 28.6 | 152.76 | 0.44 | .9928563 | 11.5 | 6 9 51.27 |
| 19 | 354 | 267 51 20.0 | 50 35.0 | 152.80 | 0.31 | .9928301 | 10.6 | 6 5 55.35 |
| 20 | 355 | 268 52 27.4 | 51 42.2 | 152.83 | 0.18 | .9928062 | 9.6 | 6 1 59.43 |
| 21 | 356 | 269 53 35.5 | 52 50.1 | 152.86 | +0.05 | .9927845 | 8.7 | 5 58 3.53 |
| 22 | 357 | 270 54 44.3 | 53 58.7 | 152.87 | —0.07 | .9927647 | 7.9 | 5 54 7.62 |
| 23 | 358 | 271 55 53.6 | 55 7.8 | 152.89 | 0.20 | .9927467 | 7.1 | 5 50 11.70 |
| 24 | 359 | 272 57 3.5 | 56 17.5 | 152.91 | 0.29 | .9927305 | 6.4 | 5 46 15.79 |
| 25 | 360 | 273 58 13.7 | 57 27.5 | 152.93 | 0.36 | .9927161 | 5.7 | 5 42 19.88 |
| 26 | 361 | 274 59 24.3 | 58 37.9 | 152.94 | 0.41 | .9927033 | 4.9 | 5 38 23.96 |
| 27 | 362 | 275 60 35.1 | 59 48.5 | 152.94 | 0.43 | .9926921 | 4.2 | 5 34 28.05 |
| 28 | 363 | 277 1 46.1 | 0 59.3 | 152.94 | 0.41 | .9926827 | 3.5 | 5 30 32.13 |
| 29 | 364 | 278 2 57.2 | 2 10.2 | 152.94 | 0.38 | .9926750 | 2.8 | 5 26 36.22 |
| 30 | 365 | 279 4 8.2 | 3 21.0 | 152.94 | 0.30 | .9926690 | 2.1 | 5 22 40.31 |
| 31 | 366 | 280 5 19.0 | 4 31.6 | 152.94 | 0.21 | .9926647 | 1.4 | 5 18 44.40 |
| 32 | 367 | 281 6 29.6 | 5 42.0 | | —0.09 | 9.9926625 | 0.7 | 5 14 48.49 |

NOTE. — λ corresponds to the *true* equinox of the date, λ′ to the *mean* equinox of Jan. 0d.

## GREENWICH MEAN TIME.

### THE MOON'S

| Day of the Month. | SEMIDIAMETER. | | HORIZONTAL PARALLAX. | | | | MERIDIAN PASSAGE. | | AGE. |
|---|---|---|---|---|---|---|---|---|---|
| | Noon. | Midnight. | Noon. | Diff. for 1 hour. | Midnight. | Diff. for 1 hour. | | Diff. for 1 hour. | |
| | ′ ″ | ′ ″ | ′ ″ | ″ | ′ ″ | ″ | h. m. | m. | d. |
| 1 | 15 29.4 | 15 33.7 | 56 44.2 | +1.31 | 57 0.3 | +1.34 | 3 13.6 | 2.28 | 3.8 |
| 2 | 15 38.1 | 15 42.6 | 57 16.7 | 1.37 | 57 33.3 | 1.40 | 4 7.1 | 2.18 | 4.8 |
| 3 | 15 47.2 | 15 51.9 | 57 50.2 | 1.43 | 58 7.4 | 1.45 | 4 58.3 | 2.07 | 5.8 |
| 4 | 15 56.7 | 16 1.4 | 58 24.7 | 1.44 | 58 41.9 | 1.42 | 5 47.2 | 1.98 | 6.8 |
| 5 | 16 6.0 | 16 10.5 | 58 58.7 | 1.38 | 59 14.9 | 1.32 | 6 34.7 | 1.95 | 7.8 |
| 6 | 16 14.7 | 16 18.5 | 59 30.2 | 1.23 | 59 44.2 | 1.11 | 7 22.3 | 1.98 | 8.8 |
| 7 | 16 21.8 | 16 24.5 | 59 56.4 | 0.95 | 60 6.4 | 0.75 | 8 11.3 | 2.08 | 9.8 |
| 8 | 16 26.5 | 16 27.7 | 60 13.8 | +0.51 | 60 18.3 | +0.24 | 9 3.1 | 2.23 | 10.8 |
| 9 | 16 28.1 | 16 27.5 | 60 19.6 | –0.05 | 60 17.5 | –0.34 | 9 58.9 | 2.43 | 11.8 |
| 10 | 16 25.9 | 16 23.3 | 60 11.7 | 0.63 | 60 2.4 | 0.92 | 10 58.9 | 2.62 | 12.8 |
| 11 | 16 19.8 | 16 15.5 | 59 49.6 | 1.19 | 59 33.8 | 1.44 | 12 1.9 | 2.70 | 13.8 |
| 12 | 16 10.5 | 16 4.8 | 59 15.2 | 1.66 | 58 54.1 | 1.84 | 13 5.3 | 2.62 | 14.8 |
| 13 | 15 58.5 | 15 51.8 | 58 31.0 | 1.97 | 58 6.5 | 2.05 | 14 5.9 | 2.43 | 15.8 |
| 14 | 15 44.9 | 15 38.0 | 57 41.3 | 2.09 | 57 16.0 | 2.10 | 15 1.7 | 2.20 | 16.8 |
| 15 | 15 31.2 | 15 24.6 | 56 51.0 | 2.07 | 56 26.7 | 2.00 | 15 52.2 | 1.98 | 17.8 |
| 16 | 15 18.3 | 15 12.4 | 56 3.5 | 1.90 | 55 41.8 | 1.76 | 16 37.9 | 1.80 | 18.8 |
| 17 | 15 7.0 | 15 2.2 | 55 22.0 | 1.58 | 55 4.4 | 1.38 | 17 20.0 | 1.68 | 19.8 |
| 18 | 14 58.0 | 14 54.5 | 54 49.0 | 1.17 | 54 36.0 | 0.95 | 17 59.8 | 1.61 | 20.8 |
| 19 | 14 51.7 | 14 49.6 | 54 25.7 | 0.73 | 54 18.0 | 0.51 | 18 38.7 | 1.60 | 21.8 |
| 20 | 14 48.2 | 14 47.5 | 54 13.0 | –0.30 | 54 10.6 | –0.10 | 19 18.0 | 1.65 | 22.8 |
| 21 | 14 47.5 | 14 48.2 | 54 10.6 | +0.10 | 54 12.9 | +0.30 | 19 58.9 | 1.74 | 23.8 |
| 22 | 14 49.5 | 14 51.4 | 54 17.6 | 0.50 | 54 24.6 | 0.68 | 20 42.3 | 1.86 | 24.8 |
| 23 | 14 53.8 | 14 56.7 | 54 33.6 | 0.84 | 54 44.3 | 0.98 | 21 29.0 | 2.03 | 25.8 |
| 24 | 15 0.0 | 15 3.6 | 54 56.5 | 1.09 | 55 9.9 | 1.18 | 22 19.6 | 2.21 | 26.8 |
| 25 | 15 7.5 | 15 11.7 | 55 24.4 | 1.25 | 55 39.7 | 1.30 | 23 13.8 | 2.35 | 27.8 |
| 26 | 15 16.1 | 15 20.6 | 55 55.6 | 1.34 | 56 11.9 | 1.37 | ☌ | | 28.8 |
| 27 | 15 25.1 | 15 29.5 | 56 28.3 | 1.38 | 56 44.6 | 1.35 | 0 10.3 | 2.40 | 0.1 |
| 28 | 15 33.8 | 15 38.0 | 57 0.5 | 1.31 | 57 15.9 | 1.26 | 1 7.1 | 2.36 | 1.1 |
| 29 | 15 42.0 | 15 45.8 | 57 30.7 | 1.20 | 57 44.8 | 1.14 | 2 2.4 | 2.25 | 2.1 |
| 30 | 15 49.4 | 15 52.8 | 57 58.1 | 1.07 | 58 10.5 | 1.00 | 2 55.1 | 2.13 | 3.1 |
| 31 | 15 56.0 | 15 58.9 | 58 22.0 | 0.93 | 58 32.6 | 0.85 | 3 45.1 | 2.02 | 4.1 |
| 32 | 16 1.5 | 16 3.9 | 58 42.3 | +0.77 | 58 51.1 | +0.69 | 4 32.9 | 1.94 | 5.1 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | MONDAY 1. | | | | | WEDNESDAY 3. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 19 48 32.97 | 2.3693 | S.26 12 21.0 | 6.449 | 0 | 21 38 11.67 | 2.1922 | S.18 25 17.2 | 12.645 |
| 1 | 19 50 55.04 | 2.3664 | 26 5 49.8 | 6.598 | 1 | 21 40 23.09 | 2.1885 | 18 12 35.6 | 12.748 |
| 2 | 19 53 16.93 | 2.3635 | 25 59 9.6 | 6.748 | 2 | 21 42 34.29 | 2.1848 | 17 59 47.8 | 12.851 |
| 3 | 19 55 38.65 | 2.3606 | 25 52 20.5 | 6.898 | 3 | 21 44 45.27 | 2.1811 | 17 46 53.9 | 12.953 |
| 4 | 19 58 0.18 | 2.3577 | 25 45 22.4 | 7.047 | 4 | 21 46 56.03 | 2.1776 | 17 33 53.9 | 13.054 |
| 5 | 20 0 21.54 | 2.3548 | 25 38 15.5 | 7.194 | 5 | 21 49 6.58 | 2.1741 | 17 20 48.0 | 13.158 |
| 6 | 20 2 42.73 | 2.3517 | 25 30 59.7 | 7.339 | 6 | 21 51 16.93 | 2.1706 | 17 7 36.1 | 13.251 |
| 7 | 20 5 3.73 | 2.3484 | 25 23 35.2 | 7.484 | 7 | 21 53 27.06 | 2.1671 | 16 54 18.4 | 13.347 |
| 8 | 20 7 24.52 | 2.3450 | 25 16 2.0 | 7.628 | 8 | 21 55 36.98 | 2.1637 | 16 40 55.0 | 13.442 |
| 9 | 20 9 45.11 | 2.3416 | 25 8 20.3 | 7.772 | 9 | 21 57 46.71 | 2.1603 | 16 27 25.9 | 13.535 |
| 10 | 20 12 5.50 | 2.3382 | 25 0 30.0 | 7.916 | 10 | 21 59 56.23 | 2.1570 | 16 13 51.2 | 13.627 |
| 11 | 20 14 25.69 | 2.3348 | 24 52 31.2 | 8.059 | 11 | 22 2 5.55 | 2.1537 | 16 0 11.0 | 13.720 |
| 12 | 20 16 45.66 | 2.3314 | 24 44 23.4 | 8.202 | 12 | 22 4 14.68 | 2.1504 | 15 46 25.4 | 13.809 |
| 13 | 20 19 5.44 | 2.3279 | 24 36 7.3 | 8.342 | 13 | 22 6 23.61 | 2.1472 | 15 32 34.3 | 13.899 |
| 14 | 20 21 25.00 | 2.3242 | 24 27 42.9 | 8.481 | 14 | 22 8 32.35 | 2.1440 | 15 18 37.9 | 13.988 |
| 15 | 20 23 44.33 | 2.3204 | 24 19 10.2 | 8.620 | 15 | 22 10 40.90 | 2.1409 | 15 4 36.2 | 14.075 |
| 16 | 20 26 3.44 | 2.3166 | 24 10 29.0 | 8.758 | 16 | 22 12 49.27 | 2.1378 | 14 50 29.3 | 14.161 |
| 17 | 20 28 22.31 | 2.3128 | 24 1 39.6 | 8.895 | 17 | 22 14 57.46 | 2.1349 | 14 36 17.4 | 14.245 |
| 18 | 20 30 40.96 | 2.3089 | 23 52 42.0 | 9.031 | 18 | 22 17 5.48 | 2.1321 | 14 22 0 4 | 14.328 |
| 19 | 20 32 59.38 | 2.3051 | 23 43 36.4 | 9.166 | 19 | 22 19 13.32 | 2.1292 | 14 7 38.4 | 14.410 |
| 20 | 20 35 17.56 | 2.3012 | 23 34 22.6 | 9.303 | 20 | 22 21 20.99 | 2.1264 | 13 53 11.5 | 14.492 |
| 21 | 20 37 35.51 | 2.2973 | 23 25 0.8 | 9.437 | 21 | 22 23 28.50 | 2.1237 | 13 38 39.8 | 14.573 |
| 22 | 20 39 53.24 | 2.2934 | 23 15 30.9 | 9.568 | 22 | 22 25 35.83 | 2.1209 | 13 24 3.2 | 14.651 |
| 23 | 20 42 10.72 | 2.2896 | S.23 5 53.2 | 9.698 | 23 | 22 27 43.02 | 2.1184 | S.13 9 22.0 | 14.729 |
| | TUESDAY 2. | | | | | THURSDAY 4. | | | |
| 0 | 20 44 27.98 | 2.2857 | S.22 56 7.6 | 9.828 | 0 | 22 29 50.05 | 2.1159 | S.12 54 36.2 | 14.806 |
| 1 | 20 46 45.01 | 2.2819 | 22 46 14.2 | 9.957 | 1 | 22 31 56.94 | 2.1134 | 12 39 45.8 | 14.880 |
| 2 | 20 49 1.81 | 2.2781 | 22 36 13.1 | 10.086 | 2 | 22 34 3.67 | 2.1110 | 12 24 51.0 | 14.954 |
| 3 | 20 51 18.38 | 2.2742 | 22 26 4.3 | 10.215 | 3 | 22 36 10.27 | 2.1086 | 12 9 51.8 | 15.027 |
| 4 | 20 53 34.71 | 2.2703 | 22 15 47.8 | 10.342 | 4 | 22 38 16.72 | 2.1064 | 11 54 48.3 | 15.099 |
| 5 | 20 55 50.80 | 2.2663 | 22 5 23.9 | 10.467 | 5 | 22 40 23.04 | 2.1042 | 11 39 40.6 | 15.169 |
| 6 | 20 58 6.65 | 2.2623 | 21 54 52.4 | 10.591 | 6 | 22 42 29.23 | 2.1020 | 11 24 28.6 | 15.237 |
| 7 | 21 0 22.27 | 2.2584 | 21 44 13.5 | 10.714 | 7 | 22 44 35.30 | 2.0999 | 11 9 12.6 | 15.304 |
| 8 | 21 2 37.66 | 2.2545 | 21 33 27.3 | 10.836 | 8 | 22 46 41.24 | 2.0981 | 10 53 52.6 | 15.371 |
| 9 | 21 4 52.82 | 2.2506 | 21 22 33.7 | 10.957 | 9 | 22 48 47.07 | 2.0962 | 10 38 28.6 | 15.437 |
| 10 | 21 7 7.74 | 2.2466 | 21 11 32.9 | 11.077 | 10 | 22 50 52.80 | 2.0944 | 10 23 0.6 | 15.501 |
| 11 | 21 9 22.41 | 2.2425 | 21 0 24.9 | 11.197 | 11 | 22 52 58.41 | 2.0926 | 10 7 28.9 | 15.563 |
| 12 | 21 11 36.82 | 2.2384 | 20 49 9.7 | 11.316 | 12 | 22 55 3 92 | 2.0909 | 9 51 53.5 | 15.623 |
| 13 | 21 13 51.00 | 2.2344 | 20 37 47.4 | 11.433 | 13 | 22 57 9.33 | 2.0894 | 9 36 14.5 | 15.683 |
| 14 | 21 16 4.95 | 2.2306 | 20 26 18.3 | 11.548 | 14 | 22 59 14.66 | 2.0879 | 9 20 31.9 | 15.742 |
| 15 | 21 18 18.67 | 2.2268 | 20 14 42.2 | 11.662 | 15 | 23 1 19.89 | 2.0864 | 9 4 45.8 | 15.800 |
| 16 | 21 20 32.16 | 2.2228 | 20 2 59.3 | 11.775 | 16 | 23 3 25.04 | 2.0850 | 8 48 56.3 | 15.857 |
| 17 | 21 22 45.41 | 2.2188 | 19 51 9.7 | 11.888 | 17 | 23 5 30.10 | 2.0837 | 8 33 3.4 | 15.912 |
| 18 | 21 24 58.42 | 2.2149 | 19 39 13.4 | 12.000 | 18 | 23 7 35.09 | 2.0825 | 8 17 7.3 | 15.966 |
| 19 | 21 27 11.20 | 2.2111 | 19 27 10.4 | 12.111 | 19 | 23 9 40.02 | 2.0813 | 8 1 7.9 | 16.019 |
| 20 | 21 29 23.75 | 2.2072 | 19 15 0.7 | 12.221 | 20 | 23 11 44.87 | 2.0802 | 7 45 5.4 | 16.070 |
| 21 | 21 31 36.07 | 2.2033 | 19 2 44.4 | 12.329 | 21 | 23 13 49.67 | 2.0792 | 7 28 59.9 | 16.120 |
| 22 | 21 33 48.16 | 2.1995 | 18 50 21.7 | 12.436 | 22 | 23 15 54.41 | 2.0783 | 7 12 51.4 | 16.169 |
| 23 | 21 36 0.03 | 2.1958 | 18 37 52.6 | 12.541 | 23 | 23 17 59.10 | 2.0775 | 7 6 40.1 | 16.217 |
| 24 | 21 38 11.67 | 2.1922 | S.18 25 17.2 | 12.645 | 24 | 23 20 3.74 | 2.0767 | S. 6 40 25.9 | 16.263 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### FRIDAY 5.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 23 20 3.74 | 2.0767 | S. 6 40 25.9 | 16.263 |
| 1 | 23 22 8.34 | 2.0763 | 6 24 9.1 | 16.308 |
| 2 | 23 24 12.92 | 2.0759 | 6 7 49.6 | 16.352 |
| 3 | 23 26 17.48 | 2.0756 | 5 51 27.6 | 16.394 |
| 4 | 23 28 22.01 | 2.0752 | 5 35 3.1 | 16.434 |
| 5 | 23 30 26.52 | 2.0749 | 5 18 36.5 | 16.474 |
| 6 | 23 32 31.01 | 2.0747 | 5 2 7.4 | 16.512 |
| 7 | 23 34 35.50 | 2.0747 | 4 45 35.9 | 16.549 |
| 8 | 23 36 39.99 | 2.0746 | 4 29 2.3 | 16.584 |
| 9 | 23 38 44.48 | 2.0748 | 4 12 26.8 | 16.618 |
| 10 | 23 40 48.98 | 2.0749 | 3 55 49.0 | 16.651 |
| 11 | 23 42 53.49 | 2.0750 | 3 39 9.4 | 16.682 |
| 12 | 23 44 58.00 | 2.0752 | 3 22 27.9 | 16.711 |
| 13 | 23 47 2.54 | 2.0758 | 3 5 44.8 | 16.739 |
| 14 | 23 49 7.12 | 2.0765 | 2 48 59.9 | 16.767 |
| 15 | 23 51 11.74 | 2.0772 | 2 32 13.4 | 16.794 |
| 16 | 23 53 16.40 | 2.0780 | 2 15 25.4 | 16.819 |
| 17 | 23 55 21.11 | 2.0788 | 1 58 35.9 | 16.843 |
| 18 | 23 57 25.88 | 2.0798 | 1 41 44.9 | 16.865 |
| 19 | 23 59 30.72 | 2.0808 | 1 24 52.8 | 16.885 |
| 20 | 0 1 35.61 | 2.0817 | 1 7 59.5 | 16.903 |
| 21 | 0 3 40.56 | 2.0828 | 0 51 5.2 | 16.921 |
| 22 | 0 5 45.58 | 2.0841 | 0 34 9.9 | 16.937 |
| 23 | 0 7 50.68 | 2.0855 | S. 0 17 13.7 | 16.950 |

### SATURDAY 6.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 0 9 55.87 | 2.0870 | S. 0 0 16.6 | 16.963 |
| 1 | 0 12 1.15 | 2.0886 | N. 0 16 41.2 | 16.975 |
| 2 | 0 14 6.53 | 2.0902 | 0 33 39.6 | 16.985 |
| 3 | 0 16 12.01 | 2.0920 | 0 50 38.6 | 16.993 |
| 4 | 0 18 17.60 | 2.0940 | 1 7 38.1 | 17.001 |
| 5 | 0 20 23.29 | 2.0960 | 1 24 37.9 | 17.007 |
| 6 | 0 22 29.14 | 2.0980 | 1 41 38.1 | 17.011 |
| 7 | 0 24 35.10 | 2.1000 | 1 58 38.4 | 17.014 |
| 8 | 0 26 41.18 | 2.1021 | 2 15 38.8 | 17.016 |
| 9 | 0 28 47.39 | 2.1045 | 2 32 39.4 | 17.015 |
| 10 | 0 30 53.75 | 2.1070 | 2 49 39.8 | 17.012 |
| 11 | 0 33 0.26 | 2.1096 | 3 6 40.0 | 17.008 |
| 12 | 0 35 6.94 | 2.1123 | 3 23 40.0 | 17.002 |
| 13 | 0 37 13.78 | 2.1150 | 3 40 39.5 | 16.995 |
| 14 | 0 39 20.78 | 2.1177 | 3 57 38.6 | 16.987 |
| 15 | 0 41 27.94 | 2.1204 | 4 14 37.2 | 16.977 |
| 16 | 0 43 35.28 | 2.1234 | 4 31 35.2 | 16.966 |
| 17 | 0 45 42.82 | 2.1267 | 4 48 32.4 | 16.953 |
| 18 | 0 47 50.52 | 2.1300 | 5 5 28.9 | 16.938 |
| 19 | 0 49 58.43 | 2.1333 | 5 22 24.5 | 16.922 |
| 20 | 0 52 6.54 | 2.1367 | 5 39 18.9 | 16.904 |
| 21 | 0 54 14.85 | 2.1402 | 5 56 12.2 | 16.884 |
| 22 | 0 56 23.37 | 2.1437 | 6 13 4.2 | 16.862 |
| 23 | 0 58 32.11 | 2.1473 | 6 29 55.0 | 16.839 |
| 24 | 1 0 41.07 | 2.1506 | N. 6 46 44.3 | 16.814 |

### SUNDAY 7.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 1 0 41.07 | 2.1506 | N. 6 46 44.3 | 16.814 |
| 1 | 1 2 50.25 | 2.1548 | 7 3 32.0 | 16.788 |
| 2 | 1 4 59.67 | 2.1588 | 7 20 18.0 | 16.760 |
| 3 | 1 7 9.33 | 2.1628 | 7 37 2.3 | 16.730 |
| 4 | 1 9 19.23 | 2.1668 | 7 53 44.8 | 16.699 |
| 5 | 1 11 29.38 | 2.1710 | 8 10 25.3 | 16.665 |
| 6 | 1 13 39.77 | 2.1752 | 8 27 3.8 | 16.629 |
| 7 | 1 15 50.43 | 2.1796 | 8 43 40.0 | 16.591 |
| 8 | 1 18 1.36 | 2.1840 | 9 0 13.9 | 16.552 |
| 9 | 1 20 12.55 | 2.1886 | 9 16 45.4 | 16.510 |
| 10 | 1 22 24.01 | 2.1932 | 9 33 14.4 | 16.470 |
| 11 | 1 24 35.76 | 2.1979 | 9 49 40.9 | 16.426 |
| 12 | 1 26 47.79 | 2.2027 | 10 6 4.8 | 16.379 |
| 13 | 1 29 0.11 | 2.2075 | 10 22 25.7 | 16.330 |
| 14 | 1 31 12.72 | 2.2124 | 10 38 43.6 | 16.280 |
| 15 | 1 33 25.63 | 2.2175 | 10 54 58.5 | 16.229 |
| 16 | 1 35 38.85 | 2.2227 | 11 11 10.3 | 16.176 |
| 17 | 1 37 52.39 | 2.2279 | 11 27 18.8 | 16.121 |
| 18 | 1 40 6.23 | 2.2331 | 11 43 24.0 | 16.064 |
| 19 | 1 42 20.39 | 2.2385 | 11 59 25.6 | 16.005 |
| 20 | 1 44 34.88 | 2.2441 | 12 15 23.6 | 15.944 |
| 21 | 1 46 49.70 | 2.2496 | 12 31 18.0 | 15.880 |
| 22 | 1 49 4.85 | 2.2551 | 12 47 8.4 | 15.814 |
| 23 | 1 51 20.33 | 2.2607 | N.13 2 54.9 | 15.741 |

### MONDAY 8.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 1 53 36.15 | 2.2662 | N.13 18 37.4 | 15.678 |
| 1 | 1 55 52.30 | 2.2720 | 13 34 15.6 | 15.608 |
| 2 | 1 58 8.81 | 2.2779 | 13 49 49.5 | 15.536 |
| 3 | 2 0 25.68 | 2.2838 | 14 5 19.0 | 15.462 |
| 4 | 2 2 42.90 | 2.2898 | 14 20 44.0 | 15.386 |
| 5 | 2 5 0.48 | 2.2958 | 14 36 4.3 | 15.308 |
| 6 | 2 7 18.42 | 2.3019 | 14 51 19.8 | 15.227 |
| 7 | 2 9 36.73 | 2.3081 | 15 6 30.5 | 15.143 |
| 8 | 2 11 55.41 | 2.3143 | 15 21 36.1 | 15.057 |
| 9 | 2 14 14.46 | 2.3206 | 15 36 36.5 | 14.969 |
| 10 | 2 16 33.89 | 2.3268 | 15 51 31.6 | 14.880 |
| 11 | 2 18 53.70 | 2.3332 | 16 6 21.3 | 14.790 |
| 12 | 2 21 13.88 | 2.3396 | 16 21 5.6 | 14.698 |
| 13 | 2 23 34.45 | 2.3459 | 16 35 44.3 | 14.604 |
| 14 | 2 25 55.41 | 2.3524 | 16 50 17.2 | 14.508 |
| 15 | 2 28 16.76 | 2.3588 | 17 4 44.2 | 14.409 |
| 16 | 2 30 38.50 | 2.3653 | 17 19 5.3 | 14.307 |
| 17 | 2 33 0.63 | 2.3720 | 17 33 20.2 | 14.202 |
| 18 | 2 35 23.16 | 2.3785 | 17 47 28.9 | 14.096 |
| 19 | 2 37 46.08 | 2.3851 | 18 1 31.2 | 13.987 |
| 20 | 2 40 9.40 | 2.3918 | 18 15 27.0 | 13.885 |
| 21 | 2 42 33.12 | 2.3985 | 18 29 16.3 | 13.772 |
| 22 | 2 44 57.24 | 2.4052 | 18 42 58.8 | 13.657 |
| 23 | 2 47 21.76 | 2.4119 | 18 56 34.4 | 13.544 |
| 24 | 2 49 46.69 | 2.4186 | N.19 10 3.1 | 13.427 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. | Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|---|---|---|---|---|
| | TUESDAY 9. | | | | | THURSDAY 11. | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 2 49 46.69 | 2.4186 | N.19 10 3.1 | 13.427 | 0 | 4 53 0.88 | 2.6848 | N.27 3 15.1 | 5.668 |
| 1 | 2 52 12.01 | 2.4253 | 19 23 24 7 | 13.307 | 1 | 4 55 42.04 | 2.6878 | 27 8 49.3 | 5.477 |
| 2 | 2 54 37.74 | 2.4321 | 19 36 39.0 | 13.188 | 2 | 4 58 23.37 | 2.6908 | 27 14 11.7 | 5.276 |
| 3 | 2 57 3.87 | 2.4389 | 19 49 45.9 | 13.062 | 3 | 5 1 4.85 | 2.6928 | 27 19 22.5 | 5.080 |
| 4 | 2 59 30.41 | 2.4455 | 20 2 45.4 | 12.935 | 4 | 5 3 46.47 | 2.6949 | 27 24 21.3 | 4.884 |
| 5 | 3 1 57.36 | 2.4524 | 20 15 37.2 | 12.812 | 5 | 5 6 28.21 | 2.6968 | 27 29 8.3 | 4.686 |
| 6 | 3 4 24.71 | 2.4593 | 20 28 21.5 | 12.682 | 6 | 5 9 10.06 | 2.6986 | 27 33 43.2 | 4.487 |
| 7 | 3 6 52.47 | 2.4661 | 20 40 58.0 | 12.549 | 7 | 5 11 52.00 | 2.7002 | 27 38 6.4 | 4.287 |
| 8 | 3 9 20.63 | 2.4728 | 20 53 26.5 | 12.415 | 8 | 5 14 34.04 | 2.7015 | 27 42 17.5 | 4.086 |
| 9 | 3 11 49.20 | 2.4795 | 21 5 46.9 | 12.279 | 9 | 5 17 16.16 | 2.7026 | 27 46 16.5 | 3.886 |
| 10 | 3 14 18.17 | 2.4862 | 21 17 59.1 | 12.140 | 10 | 5 19 58.34 | 2.7036 | 27 50 3.6 | 3.685 |
| 11 | 3 16 47.54 | 2.4928 | 21 30 2.9 | 12.001 | 11 | 5 22 40.59 | 2.7046 | 27 53 38.6 | 3.485 |
| 12 | 3 19 17.32 | 2.4994 | 21 41 58.6 | 11.861 | 12 | 5 25 22.90 | 2.7054 | 27 57 1.7 | 3.284 |
| 13 | 3 21 47.48 | 2.5060 | 21 53 45.6 | 11.719 | 13 | 5 28 5.23 | 2.7062 | 28 0 12.6 | 3.082 |
| 14 | 3 24 18.04 | 2.5126 | 22 5 24.0 | 11.576 | 14 | 5 30 47.60 | 2.7065 | 28 3 11.5 | 2.880 |
| 15 | 3 26 49.00 | 2.5191 | 22 16 53.7 | 11.428 | 15 | 5 33 29.99 | 2.7066 | 28 5 58.2 | 2.677 |
| 16 | 3 29 20.34 | 2.5256 | 22 28 14.5 | 11.278 | 16 | 5 36 12.37 | 2.7067 | 28 8 32.7 | 2.476 |
| 17 | 3 31 52.07 | 2.5323 | 22 39 26.2 | 11.129 | 17 | 5 38 54.75 | 2.7066 | 28 10 55.2 | 2.274 |
| 18 | 3 34 24.19 | 2.5380 | 22 50 29.0 | 10.976 | 18 | 5 41 37.11 | 2.7060 | 28 13 5.5 | 2.073 |
| 19 | 3 36 56.68 | 2.5445 | 23 1 22.5 | 10.822 | 19 | 5 44 19.43 | 2.7051 | 28 15 3.7 | 1.869 |
| 20 | 3 39 29.55 | 2.5512 | 23 12 6.7 | 10.667 | 20 | 5 47 1.69 | 2.7040 | 28 16 49.7 | 1.667 |
| 21 | 3 42 2.80 | 2.5574 | 23 22 41.5 | 10.507 | 21 | 5 49 43.88 | 2.7027 | 28 18 23.6 | 1.466 |
| 22 | 3 44 36.41 | 2.5638 | 23 33 6.7 | 10.344 | 22 | 5 52 25.99 | 2.7014 | 28 19 45.5 | 1.264 |
| 23 | 3 47 10.39 | 2.5698 | N.23 43 22.2 | 10.188 | 23 | 5 55 8.02 | 2.7001 | N.28 20 55.2 | 1.064 |
| | WEDNESDAY 10. | | | | | FRIDAY 12. | | | |
| 0 | 3 49 44.73 | 2.5753 | N.23 53 28.1 | 10.022 | 0 | 5 57 49.95 | 2.6983 | N.28 21 52.9 | 0.864 |
| 1 | 3 52 19.42 | 2.5813 | 24 3 24.4 | 9.858 | 1 | 6 0 31.77 | 2.6965 | 28 22 38.7 | 0.663 |
| 2 | 3 54 54.46 | 2.5870 | 24 13 10.8 | 9.693 | 2 | 6 3 13.48 | 2.6942 | 28 23 12.3 | 0.462 |
| 3 | 3 57 29.84 | 2.5927 | 24 22 47.2 | 9.525 | 3 | 6 5 55.05 | 2.6920 | 28 23 34.0 | 0.263 |
| 4 | 4 0 5.56 | 2.5983 | 24 32 13.4 | 9.356 | 4 | 6 8 36.48 | 2.6894 | 28 23 43.8 | 0.065 |
| 5 | 4 2 41.62 | 2.6040 | 24 41 29.4 | 9.182 | 5 | 6 11 17.75 | 2.6867 | 28 23 41.8 | 0.133 |
| 6 | 4 5 18.03 | 2.6096 | 24 50 35.1 | 9.009 | 6 | 6 13 58.85 | 2.6838 | 28 23 28.0 | 0.330 |
| 7 | 4 7 54.75 | 2.6148 | 24 59 30.3 | 8.835 | 7 | 6 16 39.77 | 2.6808 | 28 23 2.2 | 0.527 |
| 8 | 4 10 31.78 | 2.6198 | 25 8 15.0 | 8.659 | 8 | 6 19 20.50 | 2.6776 | 28 22 24.7 | 0.722 |
| 9 | 4 13 9.11 | 2.6248 | 25 16 49.1 | 8.482 | 9 | 6 22 1.03 | 2.6741 | 28 21 35.3 | 0.919 |
| 10 | 4 15 46.74 | 2.6298 | 25 25 12.5 | 8.302 | 10 | 6 24 41.35 | 2.6703 | 28 20 34.3 | 1.115 |
| 11 | 4 18 24.67 | 2.6348 | 25 33 25.1 | 8.122 | 11 | 6 27 21.44 | 2.6664 | 28 19 21.5 | 1.309 |
| 12 | 4 21 2.90 | 2.6396 | 25 41 27.0 | 7.940 | 12 | 6 30 1.30 | 2.6624 | 28 17 57.2 | 1.501 |
| 13 | 4 23 41.40 | 2.6442 | 25 49 17.9 | 7.757 | 13 | 6 32 40.92 | 2.6583 | 28 16 21.4 | 1.693 |
| 14 | 4 26 20.17 | 2.6486 | 25 56 57.7 | 7.572 | 14 | 6 35 20.28 | 2.6540 | 28 14 34.0 | 1.885 |
| 15 | 4 28 59.21 | 2.6528 | 26 4 26.4 | 7.386 | 15 | 6 37 59.37 | 2.6494 | 28 12 35.2 | 2.076 |
| 16 | 4 31 38.49 | 2.6570 | 26 11 44.0 | 7.200 | 16 | 6 40 38.18 | 2.6447 | 28 10 24.9 | 2.265 |
| 17 | 4 34 18.02 | 2.6610 | 26 18 50.4 | 7.015 | 17 | 6 43 16.70 | 2.6399 | 28 8 3.4 | 2.452 |
| 18 | 4 36 57.79 | 2.6648 | 26 25 45.6 | 6.826 | 18 | 6 45 54.93 | 2.6347 | 28 5 30.6 | 2.640 |
| 19 | 4 39 37.78 | 2.6684 | 26 32 29.3 | 6.637 | 19 | 6 48 32.83 | 2.6294 | 28 2 46.7 | 2.826 |
| 20 | 4 42 17.99 | 2.6721 | 26 39 1.6 | 6.445 | 20 | 6 51 10.42 | 2.6239 | 27 59 51.7 | 3.009 |
| 21 | 4 44 58.43 | 2.6756 | 26 45 22.4 | 6.252 | 21 | 6 53 47.69 | 2.6184 | 27 56 45.7 | 3.191 |
| 22 | 4 47 39.06 | 2.6790 | 26 51 31.6 | 6.059 | 22 | 6 56 24.62 | 2.6127 | 27 53 28.7 | 3.372 |
| 23 | 4 50 19.88 | 2.6824 | 26 57 29.2 | 5.864 | 23 | 6 59 1.19 | 2.6072 | 27 50 0.9 | 3.552 |
| 24 | 4 53 0.88 | 2.6848 | N.27 3 15.1 | 5.668 | 24 | 7 1 37.43 | 2.6011 | N.27 46 22.1 | 3.732 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SATURDAY 13.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 7 1 37.43 | 2.6011 | N.27 46 22.1 | 3.732 |
| 1 | 7 4 13.30 | 2.5950 | 27 42 32.8 | 3.912 |
| 2 | 7 6 48.80 | 2.5889 | 27 38 32.7 | 4.090 |
| 3 | 7 9 23.94 | 2.5827 | 27 34 22.1 | 4.264 |
| 4 | 7 11 58.69 | 2.5761 | 27 30 1.0 | 4.437 |
| 5 | 7 14 33.04 | 2.5693 | 27 25 29.2 | 4.610 |
| 6 | 7 17 6.99 | 2.5625 | 27 20 47.8 | 4.780 |
| 7 | 7 19 40.54 | 2.5557 | 27 15 55.9 | 4.950 |
| 8 | 7 22 13.66 | 2.5489 | 27 10 53.8 | 5.118 |
| 9 | 7 24 46.37 | 2.5419 | 27 5 41.7 | 5.283 |
| 10 | 7 27 18.66 | 2.5347 | 27 0 19.7 | 5.446 |
| 11 | 7 29 50.51 | 2.5273 | 26 54 48.0 | 5.609 |
| 12 | 7 32 21.92 | 2.5200 | 26 49 6.4 | 5.772 |
| 13 | 7 34 52.89 | 2.5125 | 26 43 15.2 | 5.933 |
| 14 | 7 37 23.40 | 2.5048 | 26 37 14.6 | 6.089 |
| 15 | 7 39 53.43 | 2.4971 | 26 31 4.6 | 6.244 |
| 16 | 7 42 23.01 | 2.4894 | 26 24 45.3 | 6.397 |
| 17 | 7 44 52.13 | 2.4815 | 26 18 16.6 | 6.550 |
| 18 | 7 47 20.79 | 2.4736 | 26 11 38.8 | 6.703 |
| 19 | 7 49 48.94 | 2.4658 | 26 4 52.0 | 6.854 |
| 20 | 7 52 16.64 | 2.4580 | 25 57 56.1 | 7.004 |
| 21 | 7 54 43.87 | 2.4498 | 25 50 51.5 | 7.150 |
| 22 | 7 57 10.59 | 2.4416 | 25 43 38.1 | 7.294 |
| 23 | 7 59 36.83 | 2.4336 | N.25 36 16.2 | 7.437 |

### SUNDAY 14.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 8 2 2.59 | 2.4255 | N.25 28 45.8 | 7.578 |
| 1 | 8 4 27.86 | 2.4172 | 25 21 7.0 | 7.718 |
| 2 | 8 6 52.63 | 2.4088 | 25 13 19.9 | 7.857 |
| 3 | 8 9 16.91 | 2.4004 | 25 5 24.4 | 7.991 |
| 4 | 8 11 40.68 | 2.3920 | 24 57 21.0 | 8.124 |
| 5 | 8 14 3.95 | 2.3836 | 24 49 9.6 | 8.256 |
| 6 | 8 16 26.71 | 2.3752 | 24 40 50.3 | 8.386 |
| 7 | 8 18 48.96 | 2.3668 | 24 32 23.3 | 8.515 |
| 8 | 8 21 10.71 | 2.3584 | 24 23 48.5 | 8.642 |
| 9 | 8 23 31.95 | 2.3498 | 24 15 6.2 | 8.768 |
| 10 | 8 25 52.67 | 2.3412 | 24 6 16.2 | 8.893 |
| 11 | 8 28 12.88 | 2.3326 | 23 57 19.1 | 9.014 |
| 12 | 8 30 32.59 | 2.3242 | 23 48 14.7 | 9.133 |
| 13 | 8 32 51.78 | 2.3158 | 23 39 3.1 | 9.252 |
| 14 | 8 35 10.46 | 2.3074 | 23 29 44.5 | 9.368 |
| 15 | 8 37 28.64 | 2.2988 | 23 20 19.0 | 9.482 |
| 16 | 8 39 46.30 | 2.2902 | 23 10 46.6 | 9.594 |
| 17 | 8 42 3.45 | 2.2818 | 23 1 7.6 | 9.706 |
| 18 | 8 44 20.11 | 2.2734 | 22 51 21.9 | 9.817 |
| 19 | 8 46 36.25 | 2.2649 | 22 41 29.7 | 9.925 |
| 20 | 8 48 51.88 | 2.2565 | 22 31 31.0 | 10.028 |
| 21 | 8 51 7.01 | 2.2481 | 22 21 26.2 | 10.132 |
| 22 | 8 53 21.64 | 2.2398 | 22 11 15.0 | 10.236 |
| 23 | 8 55 35.78 | 2.2315 | 22 0 57.7 | 10.339 |
| 24 | 8 57 49.50 | 2.2232 | N.21 50 34.4 | 10.439 |

### MONDAY 15.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 8 57 49.44 | 2.2232 | N.21 50 34.4 | 10.439 |
| 1 | 9 0 2.59 | 2.2150 | 21 40 5.5 | 10.534 |
| 2 | 9 2 15.25 | 2.2067 | 21 29 30.9 | 10.630 |
| 3 | 9 4 27.41 | 2.1984 | 21 18 50.6 | 10.724 |
| 4 | 9 6 39.08 | 2.1902 | 21 8 4.6 | 10.817 |
| 5 | 9 8 50.25 | 2.1822 | 20 57 13.2 | 10.907 |
| 6 | 9 11 0.94 | 2.1742 | 20 46 16.4 | 10.997 |
| 7 | 9 13 11.15 | 2.1662 | 20 35 14.2 | 11.087 |
| 8 | 9 15 20.88 | 2.1582 | 20 24 6.7 | 11.177 |
| 9 | 9 17 30.13 | 2.1501 | 20 12 53.8 | 11.261 |
| 10 | 9 19 38.90 | 2.1422 | 20 1 36.1 | 11.344 |
| 11 | 9 21 47.20 | 2.1344 | 19 50 13.4 | 11.426 |
| 12 | 9 23 55.05 | 2.1266 | 19 38 45.8 | 11.506 |
| 13 | 9 26 2.42 | 2.1190 | 19 27 13.5 | 11.585 |
| 14 | 9 28 9.33 | 2.1114 | 19 15 36.4 | 11.663 |
| 15 | 9 30 15.78 | 2.1037 | 19 3 54.7 | 11.737 |
| 16 | 9 32 21.77 | 2.0961 | 18 52 8.6 | 11.810 |
| 17 | 9 34 27.31 | 2.0885 | 18 40 18.1 | 11.885 |
| 18 | 9 36 32.41 | 2.0812 | 18 28 23.1 | 11.955 |
| 19 | 9 38 37.06 | 2.0739 | 18 16 24.0 | 12.026 |
| 20 | 9 40 41.27 | 2.0665 | 18 4 20.7 | 12.095 |
| 21 | 9 42 45.03 | 2.0592 | 17 52 13.3 | 12.162 |
| 22 | 9 44 48.36 | 2.0520 | 17 40 1.9 | 12.228 |
| 23 | 9 46 51.27 | 2.0449 | N.17 27 46.6 | 12.292 |

### TUESDAY 16.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 9 48 53.76 | 2.0379 | N.17 15 27.5 | 12.354 |
| 1 | 9 50 55.84 | 2.0310 | 17 3 4.7 | 12.416 |
| 2 | 9 52 57.51 | 2.0241 | 16 50 38.2 | 12.478 |
| 3 | 9 54 58.76 | 2.0172 | 16 38 8.0 | 12.538 |
| 4 | 9 56 59.59 | 2.0106 | 16 25 34.3 | 12.596 |
| 5 | 9 59 0.02 | 2.0039 | 16 12 57.2 | 12.653 |
| 6 | 10 1 0.07 | 1.9973 | 16 0 16.6 | 12.707 |
| 7 | 10 2 59.71 | 1.9907 | 15 47 32.9 | 12.760 |
| 8 | 10 4 58.97 | 1.9843 | 15 34 46.0 | 12.814 |
| 9 | 10 6 57.84 | 1.9779 | 15 21 56.0 | 12.867 |
| 10 | 10 8 56.34 | 1.9717 | 15 9 2.8 | 12.917 |
| 11 | 10 10 54.46 | 1.9656 | 14 56 6.6 | 12.966 |
| 12 | 10 12 52.23 | 1.9595 | 14 43 7.6 | 13.015 |
| 13 | 10 14 49.62 | 1.9534 | 14 30 5.6 | 13.062 |
| 14 | 10 16 46.66 | 1.9474 | 14 17 0.8 | 13.108 |
| 15 | 10 18 43.34 | 1.9416 | 14 3 53.3 | 13.152 |
| 16 | 10 20 39.68 | 1.9358 | 13 50 43.2 | 13.196 |
| 17 | 10 22 35.67 | 1.9302 | 13 37 30.5 | 13.238 |
| 18 | 10 24 31.32 | 1.9246 | 13 24 15.3 | 13.278 |
| 19 | 10 26 26.64 | 1.9190 | 13 10 57.7 | 13.318 |
| 20 | 10 28 21.62 | 1.9134 | 12 57 37.7 | 13.358 |
| 21 | 10 30 16.27 | 1.9081 | 12 44 15.3 | 13.397 |
| 22 | 10 32 10.61 | 1.9029 | 12 30 50.7 | 13.435 |
| 23 | 10 34 4.64 | 1.8977 | 12 17 24.0 | 13.471 |
| 24 | 10 35 58.35 | 1.8927 | N.12 3 55.0 | 13.507 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

#### WEDNESDAY 17.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 10 35 58.35 | 1.8927 | N.12 3 55.0 | 13.507 |
| 1 | 10 37 51.76 | 1.8877 | 11 50 23.9 | 13.541 |
| 2 | 10 39 44.88 | 1.8827 | 11 36 50.8 | 13.572 |
| 3 | 10 41 37.70 | 1.8777 | 11 23 15.8 | 13.603 |
| 4 | 10 43 30.23 | 1.8729 | 11 9 38.9 | 13.633 |
| 5 | 10 45 22.47 | 1.8682 | 10 56 0.1 | 13.663 |
| 6 | 10 47 14.44 | 1.8637 | 10 42 19.5 | 13.693 |
| 7 | 10 49 6.14 | 1.8591 | 10 28 37.2 | 13.723 |
| 8 | 10 50 57.57 | 1.8546 | 10 14 53.3 | 13.751 |
| 9 | 10 52 48.72 | 1.8502 | 10 1 7.8 | 13.778 |
| 10 | 10 54 39.62 | 1.8460 | 9 47 20.7 | 13.804 |
| 11 | 10 56 30.27 | 1.8418 | 9 33 32.1 | 13.828 |
| 12 | 10 58 20.66 | 1.8378 | 9 19 42.0 | 13.852 |
| 13 | 11 0 10.81 | 1.8338 | 9 5 50.5 | 13.874 |
| 14 | 11 2 0.73 | 1.8298 | 8 51 57.7 | 13.896 |
| 15 | 11 3 50.41 | 1.8260 | 8 38 3.6 | 13.917 |
| 16 | 11 5 39.86 | 1.8224 | 8 24 8.3 | 13.938 |
| 17 | 11 7 29.10 | 1.8188 | 8 10 11.8 | 13.959 |
| 18 | 11 9 18.11 | 1.8152 | 7 56 14.0 | 13.977 |
| 19 | 11 11 6.91 | 1.8116 | 7 42 15.2 | 13.994 |
| 20 | 11 12 55.51 | 1.8082 | 7 28 15.4 | 14.010 |
| 21 | 11 14 43.89 | 1.8048 | 7 14 14.6 | 14.026 |
| 22 | 11 16 32.11 | 1.8016 | 7 0 12.8 | 14.043 |
| 23 | 11 18 20.12 | 1.7983 | N. 6 46 10.1 | 14.058 |

#### THURSDAY 18.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 11 20 7.92 | 1.7953 | N. 6 32 6.7 | 14.072 |
| 1 | 11 21 55.57 | 1.7922 | 6 18 2.5 | 14.084 |
| 2 | 11 23 43.03 | 1.7893 | 6 3 57.4 | 14.096 |
| 3 | 11 25 30.32 | 1.7865 | 5 49 51.6 | 14.108 |
| 4 | 11 27 17.44 | 1.7838 | 5 35 45.2 | 14.119 |
| 5 | 11 29 4.39 | 1.7812 | 5 21 38.1 | 14.128 |
| 6 | 11 30 51.20 | 1.7787 | 5 7 30.5 | 14.137 |
| 7 | 11 32 37.86 | 1.7762 | 4 53 22.3 | 14.146 |
| 8 | 11 34 24.37 | 1.7738 | 4 39 13.6 | 14.155 |
| 9 | 11 36 10.73 | 1.7714 | 4 25 4.5 | 14.162 |
| 10 | 11 37 56.96 | 1.7692 | 4 10 54.9 | 14.168 |
| 11 | 11 39 43.06 | 1.7672 | 3 56 45.1 | 14.173 |
| 12 | 11 41 29.04 | 1.7652 | 3 42 34.9 | 14.178 |
| 13 | 11 43 14.90 | 1.7632 | 3 28 24.5 | 14.182 |
| 14 | 11 45 0.64 | 1.7613 | 3 14 13.8 | 14.185 |
| 15 | 11 46 46.27 | 1.7595 | 3 0 2.9 | 14.188 |
| 16 | 11 48 31.80 | 1.7578 | 2 45 51.9 | 14.191 |
| 17 | 11 50 17.22 | 1.7561 | 2 31 40.7 | 14.194 |
| 18 | 11 52 2.55 | 1.7545 | 2 17 29.3 | 14.196 |
| 19 | 11 53 47.79 | 1.7531 | 2 3 18.0 | 14.195 |
| 20 | 11 55 32.95 | 1.7518 | 1 49 6.7 | 14.194 |
| 21 | 11 57 18.03 | 1.7505 | 1 34 55.4 | 14.192 |
| 22 | 11 59 3.03 | 1.7492 | 1 20 44.3 | 14.190 |
| 23 | 12 0 47.96 | 1.7480 | 1 6 33.2 | 14.188 |
| 24 | 12 2 32.82 | 1.7469 | N. 0 52 22.4 | 14.185 |

#### FRIDAY 19.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 12 2 32.82 | 1.7469 | N. 0 52 22.4 | 14.185 |
| 1 | 12 4 17.62 | 1.7456 | 0 38 11.7 | 14.182 |
| 2 | 12 6 2.37 | 1.7450 | 0 24 1.2 | 14.178 |
| 3 | 12 7 47.06 | 1.7443 | N. 0 9 51.1 | 14.173 |
| 4 | 12 9 31.71 | 1.7437 | S. 0 4 18.7 | 14.167 |
| 5 | 12 11 16.31 | 1.7429 | 0 18 28.1 | 14.160 |
| 6 | 12 13 0.88 | 1.7423 | 0 32 37.2 | 14.153 |
| 7 | 12 14 45.42 | 1.7417 | 0 46 45.8 | 14.146 |
| 8 | 12 16 29.93 | 1.7413 | 1 0 53.9 | 14.138 |
| 9 | 12 18 14.41 | 1.7411 | 1 15 1.6 | 14.129 |
| 10 | 12 19 58.88 | 1.7409 | 1 29 8.7 | 14.119 |
| 11 | 12 21 43.34 | 1.7408 | 1 43 15.2 | 14.109 |
| 12 | 12 23 27.80 | 1.7408 | 1 57 21.0 | 14.098 |
| 13 | 12 25 12.26 | 1.7408 | 2 11 26.2 | 14.086 |
| 14 | 12 26 56.72 | 1.7408 | 2 25 30.7 | 14.073 |
| 15 | 12 28 41.18 | 1.7409 | 2 39 34.3 | 14.060 |
| 16 | 12 30 25.65 | 1.7412 | 2 53 37.1 | 14.047 |
| 17 | 12 32 10.14 | 1.7415 | 3 7 39.3 | 14.033 |
| 18 | 12 33 54.64 | 1.7418 | 3 21 40.7 | 14.019 |
| 19 | 12 35 39.17 | 1.7423 | 3 35 41.1 | 14.004 |
| 20 | 12 37 23.74 | 1.7428 | 3 49 40.6 | 13.988 |
| 21 | 12 39 8.34 | 1.7434 | 4 3 39.2 | 13.972 |
| 22 | 12 40 52.98 | 1.7442 | 4 17 36.7 | 13.956 |
| 23 | 12 42 37.67 | 1.7451 | S. 4 31 33.1 | 13.937 |

#### SATURDAY 20.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 12 44 22.43 | 1.7460 | S. 4 45 28.5 | 13.918 |
| 1 | 12 46 7.23 | 1.7470 | 4 59 22.7 | 13.899 |
| 2 | 12 47 52.09 | 1.7479 | 5 13 15.8 | 13.880 |
| 3 | 12 49 37.00 | 1.7489 | 5 27 7.6 | 13.860 |
| 4 | 12 51 21.98 | 1.7500 | 5 40 58.3 | 13.839 |
| 5 | 12 53 7.04 | 1.7514 | 5 54 47.6 | 13.817 |
| 6 | 12 54 52.17 | 1.7529 | 6 8 35.6 | 13.795 |
| 7 | 12 56 37.40 | 1.7544 | 6 22 22.3 | 13.772 |
| 8 | 12 58 22.71 | 1.7559 | 6 36 7.5 | 13.749 |
| 9 | 13 0 8.12 | 1.7574 | 6 49 51.3 | 13.725 |
| 10 | 13 1 53.62 | 1.7590 | 7 3 33.7 | 13.700 |
| 11 | 13 3 39.22 | 1.7607 | 7 17 14.6 | 13.674 |
| 12 | 13 6 24.93 | 1.7626 | 7 30 53.9 | 13.648 |
| 13 | 13 7 10.76 | 1.7646 | 7 44 31.6 | 13.621 |
| 14 | 13 8 56.70 | 1.7663 | 7 58 7.7 | 13.593 |
| 15 | 13 10 42.75 | 1.7682 | 8 11 42.0 | 13.564 |
| 16 | 13 12 28.92 | 1.7703 | 8 25 14.6 | 13.535 |
| 17 | 13 14 15.22 | 1.7725 | 8 38 45.5 | 13.505 |
| 18 | 13 16 1.66 | 1.7748 | 8 52 14.7 | 13.475 |
| 19 | 13 17 48.23 | 1.7772 | 9 5 41.8 | 13.444 |
| 20 | 13 19 34.95 | 1.7796 | 9 19 7.2 | 13.412 |
| 21 | 13 21 21.81 | 1.7821 | 9 32 30.7 | 13.380 |
| 22 | 13 23 8.82 | 1.7848 | 9 45 52.3 | 13.347 |
| 23 | 13 24 55.99 | 1.7875 | 9 59 11.7 | 13.313 |
| 24 | 13 26 43.32 | 1.7902 | S.10 12 29.2 | 13.278 |

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

### SUNDAY 21.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 13 26 43.32 | 1.7902 | S.10 12 29.2 | 13.278 |
| 1 | 13 28 30.81 | 1.7929 | 10 25 44.5 | 13.243 |
| 2 | 13 30 18.47 | 1.7956 | 10 38 57.6 | 13.207 |
| 3 | 13 32 6.30 | 1.7985 | 10 52 8.7 | 13.170 |
| 4 | 13 33 54.31 | 1.8016 | 11 5 17.5 | 13.132 |
| 5 | 13 35 42.51 | 1.8047 | 11 18 24.0 | 13.094 |
| 6 | 13 37 30.89 | 1.8079 | 11 31 28.1 | 13.056 |
| 7 | 13 39 19.46 | 1.8111 | 11 44 29.9 | 13.015 |
| 8 | 13 41 8.23 | 1.8144 | 11 57 29.3 | 12.975 |
| 9 | 13 42 57.19 | 1.8176 | 12 10 26.2 | 12.934 |
| 10 | 13 44 46.36 | 1.8211 | 12 23 20.6 | 12.892 |
| 11 | 13 46 35.74 | 1.8246 | 12 36 12.5 | 12.849 |
| 12 | 13 48 25.32 | 1.8281 | 12 49 1.8 | 12.806 |
| 13 | 13 50 15.12 | 1.8317 | 13 1 48.4 | 12.760 |
| 14 | 13 52 5.13 | 1.8353 | 13 14 32.3 | 12.714 |
| 15 | 13 53 55.37 | 1.8390 | 13 27 13.6 | 12.667 |
| 16 | 13 55 45.83 | 1.8428 | 13 39 51.8 | 12.620 |
| 17 | 13 57 36.52 | 1.8466 | 13 52 27.2 | 12.573 |
| 18 | 13 59 27.46 | 1.8506 | 14 5 0.0 | 12.525 |
| 19 | 14 1 18.64 | 1.8548 | 14 17 29.7 | 12.475 |
| 20 | 14 3 10.07 | 1.8589 | 14 29 56.4 | 12.425 |
| 21 | 14 5 1.74 | 1.8630 | 14 42 20.1 | 12.375 |
| 22 | 14 6 53.66 | 1.8673 | 14 54 40.8 | 12.323 |
| 23 | 14 8 45.84 | 1.8716 | S.15 6 58.3 | 12.269 |

### MONDAY 22.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 14 10 38.27 | 1.8759 | S.15 19 12.4 | 12.215 |
| 1 | 14 12 30.96 | 1.8803 | 15 31 23.4 | 12.160 |
| 2 | 14 14 23.93 | 1.8848 | 15 43 31.1 | 12.104 |
| 3 | 14 16 17.16 | 1.8895 | 15 55 35.3 | 12.048 |
| 4 | 14 18 10.68 | 1.8941 | 16 7 36.1 | 11.991 |
| 5 | 14 20 4.48 | 1.8987 | 16 19 33.5 | 11.932 |
| 6 | 14 21 58.55 | 1.9034 | 16 31 27.4 | 11.874 |
| 7 | 14 23 52.90 | 1.9082 | 16 43 17.8 | 11.814 |
| 8 | 14 25 47.54 | 1.9130 | 16 55 4.5 | 11.753 |
| 9 | 14 27 42.47 | 1.9180 | 17 6 47.5 | 11.690 |
| 10 | 14 29 37.71 | 1.9230 | 17 18 26.7 | 11.627 |
| 11 | 14 31 33.24 | 1.9280 | 17 30 2.1 | 11.564 |
| 12 | 14 33 29.07 | 1.9330 | 17 41 33.8 | 11.499 |
| 13 | 14 35 25.21 | 1.9381 | 17 53 1.4 | 11.433 |
| 14 | 14 37 21.65 | 1.9432 | 18 4 25.0 | 11.366 |
| 15 | 14 39 18.40 | 1.9484 | 18 15 44.6 | 11.298 |
| 16 | 14 41 15.48 | 1.9536 | 18 27 0.1 | 11.229 |
| 17 | 14 43 12.86 | 1.9589 | 18 38 11.4 | 11.159 |
| 18 | 14 45 10.56 | 1.9643 | 18 49 18.6 | 11.088 |
| 19 | 14 47 8.60 | 1.9698 | 19 0 21.5 | 11.016 |
| 20 | 14 49 6.96 | 1.9755 | 19 11 20.0 | 10.942 |
| 21 | 14 51 5.67 | 1.9812 | 19 22 14.0 | 10.867 |
| 22 | 14 53 4.71 | 1.9868 | 19 33 3.5 | 10.792 |
| 23 | 14 55 4.08 | 1.9925 | 19 43 48.5 | 10.716 |
| 24 | 14 57 3.75 | 1.9979 | S.19 54 28.9 | 10.640 |

### TUESDAY 23.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 14 57 3.75 | 1.9979 | S.19 54 28.9 | 10.640 |
| 1 | 14 59 3.78 | 2.0034 | 20 5 4.8 | 10.563 |
| 2 | 15 1 4.16 | 2.0093 | 20 15 35.9 | 10.484 |
| 3 | 15 3 4.89 | 2.0149 | 20 26 2.2 | 10.404 |
| 4 | 15 5 5.96 | 2.0208 | 20 36 23.7 | 10.322 |
| 5 | 15 7 7.38 | 2.0264 | 20 46 40.3 | 10.238 |
| 6 | 15 9 9.14 | 2.0322 | 20 56 51.7 | 10.154 |
| 7 | 15 11 11.25 | 2.0381 | 21 6 58.1 | 10.069 |
| 8 | 15 13 13.72 | 2.0441 | 21 16 59.5 | 9.983 |
| 9 | 15 15 16.56 | 2.0502 | 21 26 55.6 | 9.896 |
| 10 | 15 17 19.75 | 2.0562 | 21 36 46.4 | 9.808 |
| 11 | 15 19 23.30 | 2.0622 | 21 46 32.0 | 9.720 |
| 12 | 15 21 27.21 | 2.0682 | 21 56 12.3 | 9.630 |
| 13 | 15 23 31.48 | 2.0742 | 22 5 47.1 | 9.538 |
| 14 | 15 25 36.12 | 2.0803 | 22 15 16.3 | 9.445 |
| 15 | 15 27 41.13 | 2.0864 | 22 24 40.0 | 9.351 |
| 16 | 15 29 46.50 | 2.0926 | 22 33 58.0 | 9.257 |
| 17 | 15 31 52.24 | 2.0988 | 22 43 10.2 | 9.161 |
| 18 | 15 33 58.36 | 2.1049 | 22 52 16.6 | 9.064 |
| 19 | 15 36 4.84 | 2.1111 | 23 1 17.2 | 8.965 |
| 20 | 15 38 11.69 | 2.1174 | 23 10 11.9 | 8.865 |
| 21 | 15 40 18.92 | 2.1236 | 23 19 0.4 | 8.764 |
| 22 | 15 42 26.52 | 2.1298 | 23 27 42.9 | 8.662 |
| 23 | 15 44 34.49 | 2.1360 | S.23 36 19.2 | 8.559 |

### WEDNESDAY 24.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 15 46 42.82 | 2.1421 | S.23 44 49.3 | 8.455 |
| 1 | 15 48 51.53 | 2.1482 | 23 53 13.3 | 8.350 |
| 2 | 15 51 0.60 | 2.1545 | 24 1 30.8 | 8.244 |
| 3 | 15 53 10.06 | 2.1607 | 24 9 42.0 | 8.136 |
| 4 | 15 55 19.88 | 2.1668 | 24 17 46.5 | 8.026 |
| 5 | 15 57 30.08 | 2.1732 | 24 25 44.5 | 7.915 |
| 6 | 15 59 40.66 | 2.1794 | 24 33 35.8 | 7.803 |
| 7 | 16 1 51.60 | 2.1856 | 24 41 20.4 | 7.690 |
| 8 | 16 4 2.92 | 2.1918 | 24 48 57.9 | 7.576 |
| 9 | 16 6 14.60 | 2.1980 | 24 56 28.8 | 7.461 |
| 10 | 16 8 26.66 | 2.2040 | 25 3 52.8 | 7.345 |
| 11 | 16 10 39.07 | 2.2100 | 25 11 9.9 | 7.229 |
| 12 | 16 12 51.84 | 2.2161 | 25 18 19.9 | 7.111 |
| 13 | 16 15 4.99 | 2.2222 | 25 25 22.7 | 6.991 |
| 14 | 16 17 18.49 | 2.2282 | 25 32 18.2 | 6.870 |
| 15 | 16 19 32.36 | 2.2342 | 25 39 6.5 | 6.747 |
| 16 | 16 21 46.59 | 2.2402 | 25 45 47.3 | 6.623 |
| 17 | 16 24 1.18 | 2.2461 | 25 52 20.8 | 6.498 |
| 18 | 16 26 16.11 | 2.2519 | 25 58 46.8 | 6.373 |
| 19 | 16 28 31.39 | 2.2577 | 26 5 5.2 | 6.247 |
| 20 | 16 30 47.02 | 2.2636 | 26 11 15.9 | 6.119 |
| 21 | 16 33 3.02 | 2.2695 | 26 17 19.0 | 5.990 |
| 22 | 16 35 19.35 | 2.2752 | 26 23 14.2 | 5.860 |
| 23 | 16 37 36.03 | 2.2808 | 26 29 1.7 | 5.730 |
| 24 | 16 39 53.03 | 2.2864 | S.26 34 41.4 | 5.598 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### THURSDAY 25.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 16 39 53.03 | 2.2864 | S.26 34 41.4 | 5.598 |
| 1 | 16 42 10.37 | 2.2919 | 26 40 13.3 | 5.464 |
| 2 | 16 44 28.04 | 2.2974 | 26 45 37.1 | 5.329 |
| 3 | 16 46 46.04 | 2.3028 | 26 50 52.8 | 5.193 |
| 4 | 16 49 4.36 | 2.3082 | 26 56 0.4 | 5.056 |
| 5 | 16 51 23.00 | 2.3135 | 27 0 59.7 | 4.918 |
| 6 | 16 53 41.95 | 2.3188 | 27 5 50.6 | 4.779 |
| 7 | 16 56 1.21 | 2.3238 | 27 10 33.2 | 4.639 |
| 8 | 16 58 20.78 | 2.3288 | 27 15 7.4 | 4.499 |
| 9 | 17 0 40.65 | 2.3340 | 27 19 33.2 | 4.358 |
| 10 | 17 3 0.83 | 2.3389 | 27 23 50.4 | 4.216 |
| 11 | 17 5 21.30 | 2.3437 | 27 27 59.0 | 4.072 |
| 12 | 17 7 42.05 | 2.3485 | 27 31 58.9 | 3.927 |
| 13 | 17 10 3.08 | 2.3531 | 27 35 50.1 | 3.780 |
| 14 | 17 12 24.39 | 2.3578 | 27 39 32.5 | 3.633 |
| 15 | 17 14 45.98 | 2.3623 | 27 43 6.1 | 3.486 |
| 16 | 17 17 7.84 | 2.3667 | 27 46 31.0 | 3.337 |
| 17 | 17 19 29.96 | 2.3711 | 27 49 46.8 | 3.188 |
| 18 | 17 21 52.34 | 2.3755 | 27 52 53.7 | 3.038 |
| 19 | 17 24 14.97 | 2.3798 | 27 55 51.5 | 2.887 |
| 20 | 17 26 37.85 | 2.3838 | 27 58 40.2 | 2.735 |
| 21 | 17 29 0.97 | 2.3877 | 28 1 19.7 | 2.582 |
| 22 | 17 31 24.33 | 2.3914 | 28 3 50.1 | 2.429 |
| 23 | 17 33 47.91 | 2.3950 | S.28 6 11.2 | 2.275 |

### FRIDAY 26.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 17 36 11.70 | 2.3986 | S.28 8 23.1 | 2.121 |
| 1 | 17 38 35.71 | 2.4021 | 28 10 25.7 | 1.966 |
| 2 | 17 40 59.92 | 2.4055 | 28 12 19.0 | 1.811 |
| 3 | 17 43 24.34 | 2.4087 | 28 14 2.9 | 1.654 |
| 4 | 17 45 48.94 | 2.4118 | 28 15 37.3 | 1.496 |
| 5 | 17 48 13.73 | 2.4148 | 28 17 2.3 | 1.337 |
| 6 | 17 50 38.70 | 2.4178 | 28 18 17.6 | 1.177 |
| 7 | 17 53 3.84 | 2.4207 | 28 19 23.4 | 1.017 |
| 8 | 17 55 29.15 | 2.4234 | 28 20 19.7 | 0.857 |
| 9 | 17 57 54.62 | 2.4260 | 28 21 6.2 | 0.696 |
| 10 | 18 0 20.24 | 2.4284 | 28 21 43.2 | 0.534 |
| 11 | 18 2 46.00 | 2.4308 | 28 22 10.4 | 0.372 |
| 12 | 18 5 11.90 | 2.4330 | 28 22 27.9 | 0.209 |
| 13 | 18 7 37.93 | 2.4350 | 28 22 35.6 | 0.046 |
| 14 | 18 10 4.07 | 2.4368 | 28 22 33.6 | 0.117 |
| 15 | 18 12 30.32 | 2.4387 | 28 22 21.7 | 0.279 |
| 16 | 18 14 56.68 | 2.4404 | 28 22 0.2 | 0.442 |
| 17 | 18 17 23.14 | 2.4421 | 28 21 28.8 | 0.605 |
| 18 | 18 19 49.68 | 2.4436 | 28 20 47.6 | 0.765 |
| 19 | 18 22 16.30 | 2.4448 | 28 19 56.6 | 0.934 |
| 20 | 18 24 43.00 | 2.4459 | 28 18 55.7 | 1.099 |
| 21 | 18 27 9.77 | 2.4468 | 28 17 44.8 | 1.264 |
| 22 | 18 29 36.59 | 2.4477 | 28 16 24.1 | 1.429 |
| 23 | 18 32 3.46 | 2.4483 | 28 14 53.4 | 1.595 |
| 24 | 18 34 30.36 | 2.4489 | S.28 13 12.7 | 1.761 |

### SATURDAY 27.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 18 34 30.36 | 2.4489 | S.28 13 12.7 | 1.761 |
| 1 | 18 36 57.30 | 2.4494 | 28 11 22.0 | 1.926 |
| 2 | 18 39 24.27 | 2.4499 | 28 9 21.5 | 2.091 |
| 3 | 18 41 51.27 | 2.4503 | 28 7 11.1 | 2.256 |
| 4 | 18 44 18.29 | 2.4504 | 28 4 50.9 | 2.422 |
| 5 | 18 46 45.30 | 2.4503 | 28 2 20.6 | 2.588 |
| 6 | 18 49 12.30 | 2.4502 | 27 59 40.4 | 2.754 |
| 7 | 18 51 39.30 | 2.4500 | 27 56 50.3 | 2.919 |
| 8 | 18 54 6.25 | 2.4496 | 27 53 50.2 | 3.084 |
| 9 | 18 56 33.20 | 2.4490 | 27 50 40.3 | 3.249 |
| 10 | 18 59 0.10 | 2.4482 | 27 47 20.5 | 3.414 |
| 11 | 19 1 26.96 | 2.4474 | 27 43 50.9 | 3.579 |
| 12 | 19 3 53.79 | 2.4465 | 27 40 11.2 | 3.744 |
| 13 | 19 6 20.54 | 2.4455 | 27 36 21.7 | 3.908 |
| 14 | 19 8 47.23 | 2.4444 | 27 32 22.3 | 4.072 |
| 15 | 19 11 13.86 | 2.4432 | 27 28 13.1 | 4.235 |
| 16 | 19 13 40.40 | 2.4418 | 27 23 54.2 | 4.398 |
| 17 | 19 16 6.85 | 2.4402 | 27 19 25.4 | 4.562 |
| 18 | 19 18 33.20 | 2.4386 | 27 14 46.8 | 4.726 |
| 19 | 19 20 59.44 | 2.4368 | 27 9 58.4 | 4.889 |
| 20 | 19 23 25.58 | 2.4368 | 27 5 0.4 | 5.050 |
| 21 | 19 25 51.60 | 2.4329 | 26 59 52.6 | 5.210 |
| 22 | 19 28 17.50 | 2.4308 | 26 54 35.2 | 5.370 |
| 23 | 19 30 43.27 | 2.4287 | S.26 49 8.3 | 5.529 |

### SUNDAY 28.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 19 33 8.92 | 2.4265 | S.26 43 31.8 | 5.689 |
| 1 | 19 35 34.43 | 2.4242 | 26 37 45.7 | 5.848 |
| 2 | 19 37 59.79 | 2.4215 | 26 31 50.2 | 6.007 |
| 3 | 19 40 24.99 | 2.4188 | 26 25 45.0 | 6.165 |
| 4 | 19 42 50.03 | 2.4161 | 26 19 30.5 | 6.322 |
| 5 | 19 45 14.91 | 2.4134 | 26 13 6.5 | 6.477 |
| 6 | 19 47 39.65 | 2.4107 | 26 6 33.3 | 6.632 |
| 7 | 19 50 4.20 | 2.4077 | 25 59 50.7 | 6.787 |
| 8 | 19 52 28.56 | 2.4047 | 25 52 58.9 | 6.942 |
| 9 | 19 54 52.73 | 2.4017 | 25 45 57.9 | 7.096 |
| 10 | 19 57 16.70 | 2.3985 | 25 38 47.6 | 7.249 |
| 11 | 19 59 40.48 | 2.3951 | 25 31 28.2 | 7.401 |
| 12 | 20 2 4.07 | 2.3916 | 25 23 59.7 | 7.552 |
| 13 | 20 4 27.46 | 2.3881 | 25 16 22.2 | 7.702 |
| 14 | 20 6 50.63 | 2.3845 | 25 8 35.7 | 7.851 |
| 15 | 20 9 13.58 | 2.3810 | 25 0 40.2 | 8.000 |
| 16 | 20 11 36.32 | 2.3774 | 24 52 35.9 | 8.147 |
| 17 | 20 13 58.84 | 2.3736 | 24 44 22.7 | 8.294 |
| 18 | 20 16 21.14 | 2.3698 | 24 36 0.7 | 8.440 |
| 19 | 20 18 43.21 | 2.3660 | 24 27 30.1 | 8.585 |
| 20 | 20 21 5.04 | 2.3622 | 24 18 50.8 | 8.728 |
| 21 | 20 23 26.66 | 2.3584 | 24 10 3.0 | 8.869 |
| 22 | 20 25 48.02 | 2.3544 | 24 1 6.7 | 9.010 |
| 23 | 20 28 9.13 | 2.3502 | 23 52 2.0 | 9.150 |
| 24 | 20 30 29.99 | 2.3460 | S.23 42 48.8 | 9.289 |

## GREENWICH MEAN TIME.

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

### MONDAY 29.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 20 30 29.99 | 2.3460 | S.23 42 48.8 | 9.289 |
| 1 | 20 32 50.62 | 2.3417 | 23 33 27.2 | 9.427 |
| 2 | 20 35 10.98 | 2.3374 | 23 23 57.5 | 9.564 |
| 3 | 20 37 31.09 | 2.3332 | 23 14 19.5 | 9.699 |
| 4 | 20 39 50.94 | 2.3288 | 23 4 33.6 | 9.834 |
| 5 | 20 42 10.54 | 2.3244 | 22 54 39.5 | 9.968 |
| 6 | 20 44 29.87 | 2.3200 | 22 44 37.4 | 10.101 |
| 7 | 20 46 48.94 | 2.3157 | 22 34 27.4 | 10.233 |
| 8 | 20 49 7.74 | 2.3114 | 22 24 9.5 | 10.364 |
| 9 | 20 51 26.30 | 2.3071 | 22 13 43.9 | 10.493 |
| 10 | 20 53 44.58 | 2.3028 | 22 3 10.6 | 10.620 |
| 11 | 20 56 2.59 | 2.2987 | 21 52 29.6 | 10.747 |
| 12 | 20 58 20.33 | 2.2936 | 21 41 41.0 | 10.873 |
| 13 | 21 0 37.80 | 2.2891 | 21 30 45.0 | 10.997 |
| 14 | 21 2 55.00 | 2.2846 | 21 19 41.5 | 11.120 |
| 15 | 21 5 11.94 | 2.2801 | 21 8 30.8 | 11.242 |
| 16 | 21 7 28.61 | 2.2756 | 20 57 12.8 | 11.362 |
| 17 | 21 9 45.00 | 2.2710 | 20 45 47.6 | 11.481 |
| 18 | 21 12 1.12 | 2.2664 | 20 34 15.2 | 11.599 |
| 19 | 21 14 16.96 | 2.2618 | 20 22 35.7 | 11.716 |
| 20 | 21 16 32.53 | 2.2573 | 20 10 49.3 | 11.832 |
| 21 | 21 18 47.84 | 2.2529 | 19 58 55.9 | 11.946 |
| 22 | 21 21 2.88 | 2.2484 | 19 46 55.9 | 12.059 |
| 23 | 21 23 17.64 | 2.2439 | S.19 34 49.2 | 12.171 |

### TUESDAY 30.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 21 25 32.14 | 2.2394 | S.19 22 35.7 | 12.279 |
| 1 | 21 27 46.37 | 2.2349 | 19 10 15.8 | 12.388 |
| 2 | 21 30 0.33 | 2.2304 | 18 57 49.6 | 12.496 |
| 3 | 21 32 14.03 | 2.2259 | 18 45 17.0 | 12.602 |
| 4 | 21 34 27.45 | 2.2214 | 18 32 38.1 | 12.706 |
| 5 | 21 36 40.61 | 2.2171 | 18 19 52.9 | 12.810 |
| 6 | 21 38 53.52 | 2.2128 | 18 7 1.6 | 12.912 |
| 7 | 21 41 6.16 | 2.2084 | 17 54 4.2 | 13.012 |
| 8 | 21 43 18.55 | 2.2043 | 17 41 0.8 | 13.112 |
| 9 | 21 45 30.68 | 2.2000 | 17 27 51.4 | 13.210 |
| 10 | 21 47 42.55 | 2.1958 | 17 14 36.1 | 13.307 |
| 11 | 21 49 54.17 | 2.1914 | 17 1 15.1 | 13.403 |
| 12 | 21 52 5.53 | 2.1872 | 16 47 48.3 | 13.497 |
| 13 | 21 54 16.64 | 2.1830 | 16 34 16.0 | 13.589 |
| 14 | 21 56 27.51 | 2.1791 | 16 20 38.2 | 13.681 |
| 15 | 21 58 38.13 | 2.1748 | 16 6 54.8 | 13.771 |
| 16 | 22 0 48.51 | 2.1709 | 15 53 6.2 | 13.860 |
| 17 | 22 2 58.65 | 2.1671 | 15 39 12.7 | 13.948 |
| 18 | 22 5 8.58 | 2.1632 | 15 25 13.1 | 14.034 |
| 19 | 22 7 18.25 | 2.1594 | 15 11 8.8 | 14.118 |
| 20 | 22 9 27.70 | 2.1556 | 14 56 59.5 | 14.201 |
| 21 | 22 11 36.93 | 2.1517 | 14 42 45.2 | 14.283 |
| 22 | 22 13 45.92 | 2.1480 | 14 28 26.1 | 14.364 |
| 23 | 22 15 54.69 | 2.1443 | 14 14 2.2 | 14.443 |
| 24 | 22 18 3.24 | 2.1406 | S.13 59 33.6 | 14.520 |

### WEDNESDAY 31.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ |
| 0 | 22 18 3.24 | 2.1406 | S.13 59 33.6 | 14.520 |
| 1 | 22 20 11.58 | 2.1370 | 13 45 0.5 | 14.596 |
| 2 | 22 22 19.71 | 2.1336 | 13 30 22.7 | 14.672 |
| 3 | 22 24 27.64 | 2.1302 | 13 15 40.5 | 14.746 |
| 4 | 22 26 35.36 | 2.1268 | 13 0 53.9 | 14.818 |
| 5 | 22 28 42.88 | 2.1236 | 12 46 3.1 | 14.889 |
| 6 | 22 30 50.21 | 2.1204 | 12 31 8.1 | 14.959 |
| 7 | 22 32 57.35 | 2.1172 | 12 16 9.0 | 15.027 |
| 8 | 22 35 4.30 | 2.1140 | 12 1 5.8 | 15.093 |
| 9 | 22 37 11.05 | 2.1110 | 11 45 58.6 | 15.158 |
| 10 | 22 39 17.63 | 2.1080 | 11 30 47.6 | 15.222 |
| 11 | 22 41 24.03 | 2.1050 | 11 15 32.8 | 15.285 |
| 12 | 22 43 30.24 | 2.1022 | 11 0 14.3 | 15.347 |
| 13 | 22 45 36.30 | 2.0994 | 10 44 51.8 | 15.407 |
| 14 | 22 47 42.20 | 2.0966 | 10 29 26.0 | 15.466 |
| 15 | 22 49 47.93 | 2.0941 | 10 13 56.7 | 15.523 |
| 16 | 22 51 53.51 | 2.0916 | 9 58 24.1 | 15.579 |
| 17 | 22 53 58.94 | 2.0891 | 9 42 48.1 | 15.634 |
| 18 | 22 56 4.21 | 2.0867 | 9 27 8.6 | 15.687 |
| 19 | 22 58 9.36 | 2.0843 | 9 11 26.2 | 15.739 |
| 20 | 23 0 14.37 | 2.0820 | 8 55 40.7 | 15.790 |
| 21 | 23 2 19.23 | 2.0798 | 8 39 52.2 | 15.840 |
| 22 | 23 4 23.97 | 2.0778 | 8 24 0.7 | 15.888 |
| 23 | 23 6 28.59 | 2.0758 | S. 8 8 6 3 | 15.936 |

### THURSDAY, JAN. 1, 1857.

| Hour. | Right Ascension. | Diff. for 1 m. | Declination. | Diff. for 1 m. |
|---|---|---|---|---|
| 0 | 23 8 33.10 | 2.0738 | S. 7 52 9.2 | 15.983 |

### PHASES OF THE MOON.

| | Day. | h. m. |
|---|---|---|
| ☽ First Quarter, . | 4 | 15 26.5 |
| ○ Full Moon, . . | 11 | 8 13.6 |
| ☾ Last Quarter, . . | 18 | 18 43.9 |
| ● New Moon, . . | 26 | 20 45.3 |

| | Day. | h. |
|---|---|---|
| ☾ Perigee, . . . . | 8 | 23.1 |
| ☾ Apogee, . . . . | 20 | 17.7 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 44 55 36 | 3029 | 46 25 16 | 3018 | 47 55 3 | 3009 | 49 25 6 | 2997 |
| | Fomalhaut | W. | 39 50 34 | 3227 | 38 24 57 | 3260 | 36 59 59 | 3300 | 35 35 47 | 3346 |
| | a Pegasi | E. | 61 20 55 | 3068 | 59 52 6 | 3073 | 58 23 24 | 3079 | 56 54 49 | 3086 |
| | Jupiter | E. | 65 4 13 | 2663 | 63 26 43 | 2655 | 61 49 2 | 2645 | 60 11 7 | 2637 |
| | a Arietis | E. | 102 4 29 | 2699 | 100 27 48 | 2689 | 98 50 54 | 2681 | 97 13 48 | 2672 |
| 2 | Sun | W. | 56 58 36 | 2946 | 58 29 58 | 2935 | 60 1 33 | 2924 | 61 33 21 | 2913 |
| | Venus | W. | 22 59 1 | 3049 | 24 28 13 | 3034 | 25 57 44 | 3019 | 27 27 33 | 3005 |
| | a Pegasi | E. | 49 34 59 | 3155 | 48 7 56 | 3176 | 46 41 18 | 3201 | 45 15 10 | 3229 |
| | Jupiter | E. | 51 58 36 | 2594 | 50 19 33 | 2585 | 48 40 16 | 2574 | 47 0 45 | 2564 |
| | a Arietis | E. | 89 5 11 | 2625 | 87 26 50 | 2615 | 85 48 16 | 2607 | 84 9 30 | 2597 |
| 3 | Sun | W. | 69 15 47 | 2860 | 70 48 57 | 2848 | 72 22 22 | 2837 | 73 56 2 | 2827 |
| | Venus | W. | 35 0 52 | 2940 | 36 32 20 | 2927 | 38 4 4 | 2915 | 39 36 4 | 2903 |
| | Mars | W. | 23 55 55 | 2814 | 25 30 5 | 2798 | 27 4 36 | 2782 | 28 39 28 | 2766 |
| | Jupiter | E. | 38 39 48 | 2516 | 36 58 58 | 2506 | 35 17 53 | 2496 | 33 36 34 | 2486 |
| | a Arietis | E. | 75 52 28 | 2561 | 74 12 26 | 2541 | 72 32 10 | 2533 | 70 51 42 | 2523 |
| | Aldebaran | E. | 106 28 43 | 2572 | 104 49 9 | 2561 | 103 9 20 | 2549 | 101 29 15 | 2539 |
| 4 | Sun | W. | 81 47 53 | 2771 | 83 22 59 | 2760 | 84 58 20 | 2748 | 86 33 56 | 2736 |
| | Venus | W. | 47 19 55 | 2843 | 48 53 28 | 2831 | 50 27 16 | 2818 | 52 1 20 | 2807 |
| | Mars | W. | 36 38 20 | 2701 | 38 14 59 | 2689 | 39 51 54 | 2676 | 41 29 7 | 2663 |
| | a Arietis | E. | 62 26 12 | 2480 | 60 44 30 | 2470 | 59 2 35 | 2462 | 57 20 29 | 2454 |
| | Aldebaran | E. | 93 5 9 | 2485 | 91 23 35 | 2475 | 89 41 46 | 2465 | 87 59 43 | 2454 |
| 5 | Sun | W. | 94 35 35 | 2682 | 96 12 39 | 2672 | 97 49 57 | 2660 | 99 27 30 | 2650 |
| | Venus | W. | 59 55 32 | 2747 | 61 31 9 | 2736 | 63 7 1 | 2725 | 64 43 8 | 2713 |
| | a Aquilæ | W. | 55 59 44 | 3650 | 57 17 24 | 3588 | 58 36 11 | 3532 | 59 56 0 | 3479 |
| | Mars | W. | 49 39 15 | 2604 | 51 18 5 | 2592 | 52 57 11 | 2582 | 54 36 31 | 2570 |
| | a Arietis | E. | 48 47 13 | 2419 | 47 4 5 | 2413 | 45 20 49 | 2407 | 43 37 24 | 2403 |
| | Aldebaran | E. | 79 25 54 | 2406 | 77 42 26 | 2395 | 75 58 44 | 2387 | 74 14 50 | 2378 |
| 6 | Sun | W. | 107 38 49 | 2599 | 109 17 46 | 2588 | 110 56 57 | 2579 | 112 36 21 | 2570 |
| | Venus | W. | 72 47 30 | 2658 | 74 25 6 | 2648 | 76 2 56 | 2638 | 77 41 0 | 2629 |
| | a Aquilæ | W. | 66 48 40 | 3265 | 68 13 33 | 3230 | 69 39 7 | 3198 | 71 5 18 | 3169 |
| | Mars | W. | 62 57 4 | 2515 | 64 37 56 | 2505 | 66 19 2 | 2494 | 68 0 23 | 2485 |
| | Fomalhaut | W. | 35 51 44 | 2913 | 37 23 46 | 2853 | 38 57 5 | 2799 | 40 31 34 | 2751 |
| | Aldebaran | E. | 65 32 13 | 2337 | 63 47 7 | 2330 | 62 1 51 | 2323 | 60 16 25 | 2317 |
| | Saturn | E. | 100 27 43 | 2263 | 98 40 49 | 2253 | 96 53 41 | 2244 | 95 6 19 | 2235 |
| 7 | Sun | W. | 120 56 21 | 2529 | 122 36 54 | 2521 | 124 17 38 | 2514 | 125 58 32 | 2507 |
| | Venus | W. | 85 54 29 | 2581 | 87 33 50 | 2574 | 89 13 21 | 2566 | 90 53 3 | 2559 |
| | a Aquilæ | W. | 78 24 12 | 3054 | 79 53 18 | 3036 | 81 22 46 | 3022 | 82 52 32 | 3007 |
| | Mars | W. | 76 30 15 | 2441 | 78 12 51 | 2433 | 79 55 38 | 2426 | 81 38 36 | 2419 |
| | Fomalhaut | W. | 48 38 5 | 2572 | 50 17 39 | 2544 | 51 57 51 | 2520 | 53 38 37 | 2502 |
| | Jupiter | W. | 17 5 48 | 2207 | 18 54 5 | 2199 | 20 42 34 | 2191 | 22 31 15 | 2185 |
| | Aldebaran | E. | 51 27 23 | 2296 | 49 41 18 | 2295 | 47 55 11 | 2294 | 46 9 3 | 2294 |
| | Saturn | E. | 86 6 13 | 2194 | 84 17 36 | 2186 | 82 28 48 | 2180 | 80 39 50 | 2173 |
| | Pollux | E. | 94 35 54 | 2194 | 92 47 18 | 2187 | 90 58 31 | 2180 | 89 9 33 | 2173 |
| 8 | Venus | W. | 99 13 51 | 2527 | 100 54 26 | 2523 | 102 35 7 | 2520 | 104 15 53 | 2516 |
| | Mars | W. | 90 15 48 | 2389 | 91 59 39 | 2384 | 93 43 36 | 2380 | 95 27 39 | 2377 |
| | Fomalhaut | W. | 62 9 24 | 2412 | 63 52 41 | 2400 | 65 36 16 | 2388 | 67 20 8 | 2378 |
| | a Pegasi | W. | 42 39 37 | 2850 | 44 13 0 | 2801 | 45 47 27 | 2756 | 47 22 53 | 2717 |
| | Jupiter | W. | 31 36 49 | 2158 | 33 26 20 | 2154 | 35 15 57 | 2150 | 37 5 40 | 2147 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 1 | Sun | W. | 50 55 22 | 2987 | 52 25 51 | 2977 | 53 56 33 | 2966 | 55 27 28 | 2956 |
| | Fomalhaut | W. | 34 12 29 | 3401 | 32 50 14 | 3466 | 31 29 12 | 3542 | 30 9 34 | 3624 |
| | α Pegasi | E. | 55 26 22 | 3097 | 53 58 9 | 3108 | 52 30 9 | 3121 | 51 2 25 | 3136 |
| | Jupiter | E. | 58 33 2 | 2628 | 56 54 45 | 2618 | 55 16 15 | 2607 | 53 37 30 | 2601 |
| | α Arietis | E. | 95 36 30 | 2662 | 93 58 59 | 2653 | 92 21 16 | 2643 | 90 43 20 | 2634 |
| 2 | Sun | W. | 63 5 24 | 2903 | 64 37 38 | 2892 | 66 10 7 | 2881 | 67 42 50 | 2870 |
| | Venus | W. | 28 57 40 | 2991 | 30 28 4 | 2978 | 31 58 44 | 2965 | 33 29 40 | 2953 |
| | α Pegasi | E. | 43 49 35 | 3261 | 42 24 38 | 3300 | 41 0 26 | 3343 | 39 37 4 | 3391 |
| | Jupiter | E. | 45 21 0 | 2553 | 43 41 1 | 2545 | 42 0 50 | 2536 | 40 20 27 | 2525 |
| | α Arietis | E. | 82 30 31 | 2588 | 80 51 20 | 2578 | 79 11 55 | 2569 | 77 32 18 | 2560 |
| 3 | Sun | W. | 75 29 56 | 2815 | 77 4 4 | 2805 | 78 38 26 | 2794 | 80 13 2 | 2782 |
| | Venus | W. | 41 8 19 | 2891 | 42 40 50 | 2879 | 44 13 36 | 2866 | 45 46 38 | 2855 |
| | Mars | W. | 30 14 38 | 2753 | 31 50 7 | 2741 | 33 25 53 | 2726 | 35 1 58 | 2715 |
| | Jupiter | E. | 31 55 0 | 2476 | 30 13 13 | 2466 | 28 31 12 | 2456 | 26 48 57 | 2446 |
| | α Arietis | E. | 69 11 1 | 2515 | 67 30 8 | 2505 | 65 49 2 | 2496 | 64 7 43 | 2487 |
| | Aldebaran | E. | 99 48 56 | 2527 | 98 8 21 | 2517 | 96 27 32 | 2507 | 94 46 28 | 2496 |
| 4 | Sun | W. | 88 9 46 | 2726 | 89 45 51 | 2715 | 91 22 11 | 2704 | 92 58 46 | 2693 |
| | Venus | W. | 53 35 39 | 2795 | 55 10 14 | 2783 | 56 45 4 | 2771 | 58 20 10 | 2759 |
| | Mars | W. | 43 6 36 | 2652 | 44 44 21 | 2639 | 46 22 23 | 2627 | 48 0 41 | 2615 |
| | α Arietis | E. | 55 38 11 | 2446 | 53 55 42 | 2438 | 52 13 2 | 2431 | 50 30 12 | 2425 |
| | Aldebaran | E. | 86 17 25 | 2444 | 84 34 53 | 2434 | 82 52 7 | 2424 | 81 9 7 | 2415 |
| 5 | Sun | W. | 101 5 17 | 2639 | 102 43 19 | 2629 | 104 21 35 | 2618 | 106 0 5 | 2608 |
| | Venus | W. | 66 19 30 | 2701 | 67 56 8 | 2690 | 69 33 1 | 2680 | 71 10 8 | 2669 |
| | α Aquilæ | W. | 61 16 48 | 3429 | 62 38 32 | 3384 | 64 1 7 | 3341 | 65 24 31 | 3302 |
| | Mars | W. | 56 16 7 | 2559 | 57 55 59 | 2548 | 59 36 6 | 2537 | 61 16 28 | 2527 |
| | α Arietis | E. | 41 53 54 | 2401 | 40 10 20 | 2398 | 38 26 42 | 2397 | 36 43 3 | 2396 |
| | Aldebaran | E. | 72 30 43 | 2368 | 70 46 23 | 2360 | 69 1 51 | 2352 | 67 17 7 | 2345 |
| 6 | Sun | W. | 114 15 57 | 2561 | 115 55 46 | 2553 | 117 35 46 | 2544 | 119 15 58 | 2536 |
| | Venus | W. | 79 19 16 | 2619 | 80 57 45 | 2610 | 82 36 26 | 2600 | 84 15 21 | 2591 |
| | α Aquilæ | W. | 72 32 4 | 3142 | 73 59 23 | 3117 | 75 27 12 | 3094 | 76 55 29 | 3073 |
| | Mars | W. | 69 41 57 | 2477 | 71 23 43 | 2468 | 73 5 41 | 2459 | 74 47 52 | 2450 |
| | Fomalhaut | W. | 42 7 6 | 2707 | 43 43 36 | 2667 | 45 21 0 | 2632 | 46 59 11 | 2601 |
| | Aldebaran | E. | 58 30 51 | 2312 | 56 45 9 | 2307 | 54 59 19 | 2303 | 53 13 24 | 2299 |
| | Saturn | E. | 93 18 43 | 2227 | 91 30 55 | 2218 | 89 42 54 | 2209 | 87 54 40 | 2200 |
| 7 | Sun | W. | 127 39 35 | 2502 | 129 20 45 | 2498 | 131 2 1 | 2495 | 132 43 21 | 2494 |
| | Venus | W. | 92 32 55 | 2552 | 94 12 56 | 2545 | 95 53 6 | 2540 | 97 33 24 | 2533 |
| | α Aquilæ | W. | 84 22 36 | 2996 | 85 52 54 | 2985 | 87 23 24 | 2977 | 88 54 5 | 2969 |
| | Mars | W. | 83 21 44 | 2412 | 85 5 2 | 2405 | 86 48 29 | 2400 | 88 32 4 | 2394 |
| | Fomalhaut | W. | 55 19 53 | 2477 | 57 1 39 | 2459 | 58 43 50 | 2442 | 60 26 25 | 2425 |
| | Jupiter | W. | 24 20 5 | 2180 | 26 9 3 | 2174 | 27 58 10 | 2168 | 29 47 26 | 2163 |
| | Aldebaran | E. | 44 22 55 | 2296 | 42 36 50 | 2300 | 40 50 51 | 2305 | 39 4 59 | 2310 |
| | Saturn | E. | 78 50 42 | 2167 | 77 1 24 | 2161 | 75 11 58 | 2156 | 73 22 24 | 2151 |
| | Pollux | E. | 87 20 24 | 2167 | 85 31 6 | 2161 | 83 41 40 | 2155 | 81 52 5 | 2150 |
| 8 | Venus | W. | 105 56 44 | 2512 | 107 37 40 | 2510 | 109 18 40 | 2507 | 110 59 43 | 2506 |
| | Mars | W. | 97 11 47 | 2373 | 98 56 0 | 2371 | 100 40 16 | 2369 | 102 24 35 | 2368 |
| | Fomalhaut | W. | 69 4 14 | 2369 | 70 48 33 | 2362 | 72 33 3 | 2355 | 74 17 42 | 2350 |
| | α Pegasi | W. | 48 59 10 | 2682 | 50 36 14 | 2652 | 52 13 59 | 2624 | 53 52 22 | 2600 |
| | Jupiter | W. | 38 55 28 | 2143 | 40 45 21 | 2141 | 42 35 17 | 2140 | 44 25 15 | 2139 |

## GREENWICH MEAN TIME.

### LUNAR DISTANCES

| Day of the Month. | Star's Name and Position. | | Noon. ° ′ ″ | P. L. of Diff. | IIIh. ° ′ ″ | P. L. of Diff. | VIh. ° ′ ″ | P. L. of Diff. | IXh. ° ′ ″ | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Saturn | E. | 71 32 42 | 2147 | 69 42 54 | 2143 | 67 53 0 | 2140 | 66 3 2 | 2137 |
| | Pollux | E. | 80 2 22 | 2145 | 78 12 32 | 2141 | 76 22 35 | 2137 | 74 32 33 | 2134 |
| 9 | Mars | W. | 104 8 56 | 2367 | 105 53 18 | 2367 | 107 37 40 | 2367 | 109 22 2 | 2368 |
| | Fomalhaut | W. | 76 2 28 | 2345 | 77 47 22 | 2342 | 79 32 21 | 2339 | 81 17 23 | 2338 |
| | a Pegasi | W. | 55 31 17 | 2577 | 57 10 43 | 2559 | 58 50 34 | 2542 | 60 30 49 | 2528 |
| | Jupiter | W. | 46 15 15 | 2138 | 48 5 16 | 2137 | 49 55 18 | 2137 | 51 45 20 | 2138 |
| | Saturn | E. | 56 52 24 | 2132 | 55 2 14 | 2134 | 53 12 6 | 2135 | 51 22 0 | 2137 |
| | Pollux | E. | 65 21 18 | 2124 | 63 30 56 | 2124 | 61 40 34 | 2124 | 59 50 12 | 2125 |
| | Regulus | E. | 102 3 24 | 2129 | 100 13 9 | 2128 | 98 22 53 | 2129 | 96 32 39 | 2129 |
| 10 | Fomalhaut | W. | 90 2 32 | 2347 | 91 47 23 | 2351 | 93 32 8 | 2357 | 95 16 45 | 2364 |
| | a Pegasi | W. | 68 56 3 | 2485 | 70 37 38 | 2482 | 72 19 17 | 2480 | 74 0 58 | 2479 |
| | Jupiter | W. | 60 54 49 | 2151 | 62 44 30 | 2157 | 64 34 3 | 2161 | 66 23 29 | 2167 |
| | a Arietis | W. | 25 22 35 | 2362 | 27 7 4 | 2340 | 28 52 5 | 2323 | 30 37 31 | 2309 |
| | Saturn | E. | 42 12 53 | 2168 | 40 23 30 | 2171 | 38 34 19 | 2180 | 36 45 22 | 2190 |
| | Pollux | E. | 50 39 1 | 2139 | 48 49 1 | 2143 | 46 59 7 | 2148 | 45 9 21 | 2154 |
| | Regulus | E. | 87 21 57 | 2141 | 85 32 1 | 2147 | 83 42 13 | 2151 | 81 52 31 | 2157 |
| 11 | a Pegasi | W. | 82 29 6 | 2494 | 84 10 27 | 2502 | 85 51 38 | 2509 | 87 32 37 | 2518 |
| | Jupiter | W. | 75 28 14 | 2203 | 77 16 37 | 2212 | 79 4 46 | 2222 | 80 52 41 | 2233 |
| | a Arietis | W. | 39 27 55 | 2288 | 41 14 12 | 2289 | 43 0 27 | 2294 | 44 46 36 | 2297 |
| | Saturn | E. | 27 45 17 | 2269 | 25 58 32 | 2293 | 24 12 22 | 2320 | 22 26 52 | 2358 |
| | Pollux | E. | 36 2 58 | 2192 | 34 14 18 | 2201 | 32 25 52 | 2211 | 30 37 40 | 2222 |
| | Regulus | E. | 72 46 26 | 2193 | 70 57 48 | 2200 | 69 9 23 | 2211 | 67 21 12 | 2221 |
| 12 | a Pegasi | W. | 95 54 4 | 2579 | 97 33 28 | 2595 | 99 12 30 | 2610 | 100 51 11 | 2627 |
| | Jupiter | W. | 89 48 19 | 2292 | 91 34 30 | 2305 | 93 20 22 | 2314 | 95 6 1 | 2328 |
| | a Arietis | W. | 53 35 18 | 2335 | 55 20 27 | 2345 | 57 5 21 | 2355 | 58 50 0 | 2366 |
| | Aldebaran | W. | 24 3 12 | 2642 | 25 41 10 | 2610 | 27 19 52 | 2586 | 28 59 6 | 2569 |
| | Regulus | E. | 58 24 19 | 2279 | 56 37 49 | 2293 | 54 51 39 | 2306 | 53 5 48 | 2320 |
| 13 | Jupiter | W. | 103 48 53 | 2404 | 105 32 22 | 2419 | 107 15 29 | 2435 | 108 58 14 | 2453 |
| | a Arietis | W. | 67 28 50 | 2432 | 69 11 39 | 2446 | 70 54 8 | 2461 | 72 36 16 | 2477 |
| | Aldebaran | W. | 37 18 56 | 2548 | 38 59 3 | 2551 | 40 39 5 | 2556 | 42 19 0 | 2565 |
| | Regulus | E. | 44 21 55 | 2396 | 42 38 15 | 2413 | 40 54 59 | 2430 | 39 12 7 | 2447 |
| | Spica | E. | 98 20 15 | 2384 | 96 36 18 | 2400 | 94 52 43 | 2416 | 93 9 31 | 2431 |
| 14 | a Arietis | W. | 81 1 26 | 2556 | 82 41 21 | 2573 | 84 20 53 | 2589 | 86 0 3 | 2607 |
| | Aldebaran | W. | 50 35 33 | 2615 | 52 14 8 | 2627 | 53 52 26 | 2640 | 55 30 27 | 2654 |
| | Saturn | W. | 16 8 47 | 2751 | 17 44 19 | 2725 | 19 20 26 | 2707 | 20 56 56 | 2698 |
| | Regulus | E. | 30 44 1 | 2539 | 29 3 42 | 2559 | 27 23 50 | 2579 | 25 44 26 | 2600 |
| | Spica | E. | 84 39 14 | 2515 | 82 58 21 | 2531 | 81 17 51 | 2548 | 79 37 45 | 2565 |
| 15 | a Arietis | W. | 94 10 4 | 2692 | 95 46 55 | 2708 | 97 23 24 | 2725 | 98 59 30 | 2742 |
| | Aldebaran | W. | 63 35 49 | 2725 | 65 11 56 | 2740 | 66 47 43 | 2755 | 68 23 10 | 2769 |
| | Saturn | W. | 29 0 33 | 2710 | 30 36 59 | 2719 | 32 13 14 | 2729 | 33 49 15 | 2740 |
| | Pollux | W. | 19 29 3 | 2664 | 21 6 31 | 2680 | 22 43 38 | 2695 | 24 20 25 | 2709 |
| | Spica | E. | 71 23 5 | 2650 | 69 45 18 | 2667 | 68 7 54 | 2684 | 66 30 52 | 2701 |
| | Sun | E. | 132 55 12 | 3030 | 131 25 36 | 3047 | 129 56 22 | 3065 | 128 27 29 | 3080 |
| 16 | Aldebaran | W. | 76 15 35 | 2846 | 77 49 6 | 2859 | 79 22 18 | 2873 | 80 55 12 | 2897 |
| | Saturn | W. | 41 45 41 | 2799 | 43 20 10 | 2811 | 44 54 23 | 2824 | 46 28 20 | 2837 |
| | Pollux | W. | 32 19 21 | 2785 | 33 54 8 | 2800 | 35 28 36 | 2814 | 37 2 46 | 2829 |
| | Spica | E. | 58 31 10 | 2780 | 56 56 16 | 2795 | 55 21 42 | 2811 | 53 47 28 | 2826 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XVIIIh. | P L of Diff. | XXIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|
| | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 8 | Saturn E. | 64 12 59 | 2136 | 62 22 53 | 2134 | 60 32 45 | 2132 | 58 42 35 | 2132 |
| | Pollux E. | 72 42 25 | 2131 | 70 52 13 | 2128 | 69 1 57 | 2127 | 67 11 39 | 2125 |
| 9 | Mars W. | 111 6 22 | 2370 | 112 50 40 | 2372 | 114 34 55 | 2375 | 116 19 6 | 2379 |
| | Fomalhaut W. | 83 2 27 | 2338 | 84 47 31 | 2339 | 86 32 34 | 2340 | 88 17 35 | 2343 |
| | α Pegasi W. | 62 11 23 | 2516 | 63 52 14 | 2505 | 65 33 20 | 2497 | 67 14 37 | 2491 |
| | Jupiter W. | 53 35 21 | 2140 | 55 25 19 | 2143 | 57 15 13 | 2145 | 59 5 3 | 2148 |
| | Saturn E. | 49 31 58 | 2141 | 47 42 1 | 2146 | 45 52 10 | 2150 | 44 2 27 | 2156 |
| | Pollux E. | 57 59 51 | 2127 | 56 9 33 | 2129 | 54 19 18 | 2132 | 52 29 7 | 2135 |
| | Regulus E. | 94 42 24 | 2132 | 92 52 13 | 2133 | 91 2 4 | 2134 | 89 11 57 | 2137 |
| 10 | Fomalhaut W. | 97 1 11 | 2372 | 98 45 26 | 2380 | 100 29 29 | 2390 | 102 13 18 | 2400 |
| | α Pegasi W. | 75 42 41 | 2480 | 77 24 22 | 2481 | 79 6 2 | 2484 | 80 47 37 | 2489 |
| | Jupiter W. | 68 12 46 | 2173 | 70 1 54 | 2180 | 71 50 52 | 2187 | 73 39 39 | 2195 |
| | α Arietis W. | 32 23 17 | 2300 | 34 9 16 | 2294 | 35 55 24 | 2290 | 37 41 38 | 2288 |
| | Saturn E. | 34 56 40 | 2208 | 33 8 17 | 2216 | 31 20 13 | 2231 | 29 32 32 | 2249 |
| | Pollux E. | 43 19 44 | 2160 | 41 30 16 | 2167 | 39 40 58 | 2174 | 37 51 51 | 2183 |
| | Regulus E. | 80 2 58 | 2163 | 78 13 35 | 2170 | 76 24 21 | 2176 | 74 35 18 | 2184 |
| 11 | α Pegasi W. | 89 13 27 | 2528 | 90 54 1 | 2540 | 92 34 19 | 2551 | 94 14 21 | 2565 |
| | Jupiter W. | 82 40 20 | 2243 | 84 27 44 | 2253 | 86 14 53 | 2264 | 88 1 46 | 2277 |
| | α Arietis W. | 46 32 40 | 2303 | 48 18 35 | 2309 | 50 4 21 | 2317 | 51 49 56 | 2326 |
| | Saturn E. | 20 42 10 | 2393 | 18 58 25 | 2442 | 17 15 50 | 2504 | 15 34 42 | 2584 |
| | Pollux E. | 28 49 45 | 2233 | 27 2 6 | 2245 | 25 14 45 | 2258 | 23 27 43 | 2270 |
| | Regulus E. | 65 33 16 | 2232 | 63 45 36 | 2243 | 61 58 13 | 2255 | 60 11 7 | 2267 |
| 12 | α Pegasi W. | 102 29 29 | 2646 | 104 7 21 | 2665 | 105 44 48 | 2685 | 107 21 48 | 2705 |
| | Jupiter W. | 96 51 19 | 2344 | 98 36 15 | 2359 | 100 20 49 | 2373 | 102 5 2 | 2389 |
| | α Arietis W. | 60 34 21 | 2378 | 62 18 27 | 2391 | 64 2 14 | 2405 | 65 45 42 | 2419 |
| | Aldebaran W. | 30 38 43 | 2556 | 32 18 36 | 2551 | 33 58 39 | 2547 | 35 38 47 | 2546 |
| | Regulus E. | 51 20 18 | 2335 | 49 35 10 | 2349 | 47 50 22 | 2365 | 46 5 57 | 2381 |
| 13 | Jupiter W. | 110 40 34 | 2468 | 112 22 32 | 2485 | 114 4 6 | 2502 | 115 45 17 | 2519 |
| | α Arietis W. | 74 18 2 | 2492 | 75 59 27 | 2508 | 77 40 29 | 2524 | 79 21 9 | 2540 |
| | Aldebaran W. | 43 58 43 | 2572 | 45 38 17 | 2582 | 47 17 37 | 2592 | 48 56 43 | 2604 |
| | Regulus E. | 37 29 39 | 2465 | 35 47 36 | 2483 | 34 5 59 | 2501 | 32 24 47 | 2520 |
| | Spica E. | 91 26 41 | 2448 | 89 44 14 | 2465 | 88 2 11 | 2481 | 86 20 31 | 2497 |
| 14 | α Arietis W. | 87 38 49 | 2623 | 89 17 13 | 2640 | 90 55 13 | 2657 | 92 32 50 | 2675 |
| | Aldebaran W. | 57 8 9 | 2667 | 58 45 33 | 2682 | 60 22 37 | 2695 | 61 59 23 | 2710 |
| | Saturn W. | 22 33 39 | 2694 | 24 10 27 | 2695 | 25 47 14 | 2698 | 27 23 57 | 2703 |
| | Regulus E. | 24 5 31 | 2622 | 22 27 6 | 2645 | 20 49 12 | 2670 | 19 11 52 | 2696 |
| | Spica E. | 77 58 2 | 2583 | 76 18 43 | 2599 | 74 39 47 | 2616 | 73 1 14 | 2634 |
| 15 | α Arietis W. | 100 35 14 | 2759 | 102 10 36 | 2775 | 103 45 36 | 2792 | 105 20 15 | 2808 |
| | Aldebaran W. | 69 58 18 | 2785 | 71 33 6 | 2799 | 73 7 35 | 2815 | 74 41 44 | 2828 |
| | Saturn W. | 35 25 2 | 2750 | 37 0 35 | 2762 | 38 35 53 | 2774 | 40 10 55 | 2786 |
| | Pollux W. | 25 56 53 | 2725 | 27 33 0 | 2741 | 29 8 46 | 2755 | 30 44 13 | 2769 |
| | Spica E. | 64 54 13 | 2716 | 63 17 55 | 2733 | 61 41 59 | 2749 | 60 6 24 | 2765 |
| | Sun E. | 126 58 57 | 3098 | 125 30 44 | 3114 | 124 2 52 | 3132 | 122 35 21 | 3148 |
| 16 | Aldebaran W. | 82 27 48 | 2901 | 84 0 6 | 2915 | 85 32 6 | 2928 | 87 3 49 | 2941 |
| | Saturn W. | 48 2 0 | 2849 | 49 35 24 | 2861 | 51 8 33 | 2873 | 52 41 26 | 2884 |
| | Pollux W. | 38 36 36 | 2843 | 40 10 8 | 2857 | 41 43 22 | 2870 | 43 16 19 | 2882 |
| | Spica E. | 52 13 33 | 2840 | 50 39 57 | 2854 | 49 6 39 | 2868 | 47 33 39 | 2880 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Noon. | P. L. of Diff. | IIIh. | P. L. of Diff. | VIh. | P. L. of Diff. | IXh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 16 | Sun | E. | 121 8 10 | 3164 | 119 41 17 | 3180 | 118 14 44 | 3197 | 116 48 31 | 3212 |
| 17 | Aldebaran | W. | 88 35 16 | 2954 | 90 6 27 | 2966 | 91 37 22 | 2980 | 93 8 0 | 2991 |
| | Saturn | W. | 54 14 5 | 2897 | 55 46 28 | 2909 | 57 18 36 | 2919 | 58 50 31 | 2930 |
| | Pollux | W. | 44 49 1 | 2897 | 46 21 24 | 2909 | 47 53 32 | 2920 | 49 25 25 | 2932 |
| | Spica | E. | 46 0 55 | 2894 | 44 28 29 | 2906 | 42 56 18 | 2920 | 41 24 24 | 2933 |
| | Sun | E. | 109 41 53 | 3285 | 108 17 24 | 3299 | 106 53 11 | 3312 | 105 29 13 | 3326 |
| 18 | Saturn | W. | 66 26 47 | 2979 | 67 57 26 | 2988 | 69 27 54 | 2996 | 70 58 12 | 3004 |
| | Pollux | W. | 57 1 17 | 2985 | 58 31 48 | 2993 | 60 2 9 | 3003 | 61 32 18 | 3011 |
| | Regulus | W. | 20 29 27 | 3030 | 21 59 2 | 3034 | 23 28 32 | 3038 | 24 57 58 | 3043 |
| | Spica | E. | 33 48 30 | 2985 | 32 17 59 | 2995 | 30 47 40 | 3003 | 29 17 31 | 3018 |
| | Sun | E. | 98 32 57 | 3381 | 97 10 19 | 3392 | 95 47 53 | 3402 | 94 25 31 | 3411 |
| 19 | Saturn | W. | 78 27 28 | 3036 | 79 56 56 | 3042 | 81 26 17 | 3047 | 82 55 32 | 3050 |
| | Pollux | W. | 69 0 44 | 3045 | 70 30 1 | 3051 | 71 59 11 | 3056 | 73 28 15 | 3060 |
| | Regulus | W. | 32 23 45 | 3065 | 33 52 36 | 3069 | 35 21 26 | 3071 | 36 50 11 | 3075 |
| | Sun | E. | 87 36 49 | 3449 | 86 15 28 | 3454 | 84 54 13 | 3461 | 83 33 5 | 3465 |
| 20 | Saturn | W. | 90 20 45 | 3065 | 91 49 38 | 3066 | 93 18 29 | 3067 | 94 47 19 | 3068 |
| | Pollux | W. | 80 52 26 | 3075 | 82 21 6 | 3076 | 83 49 45 | 3078 | 85 18 22 | 3078 |
| | Regulus | W. | 44 13 2 | 3086 | 45 41 30 | 3087 | 47 9 56 | 3087 | 48 38 22 | 3087 |
| | Sun | E. | 76 48 34 | 3483 | 75 27 51 | 3484 | 74 7 9 | 3486 | 72 46 29 | 3487 |
| 21 | Saturn | W. | 102 11 27 | 3065 | 103 40 20 | 3062 | 105 9 16 | 3060 | 106 38 14 | 3057 |
| | Pollux | W. | 92 41 31 | 3073 | 94 10 13 | 3071 | 95 38 58 | 3069 | 97 7 46 | 3066 |
| | Regulus | W. | 56 0 42 | 3081 | 57 29 15 | 3078 | 58 57 51 | 3075 | 60 26 31 | 3072 |
| | Sun | E. | 66 3 14 | 3484 | 64 42 32 | 3482 | 63 21 48 | 3480 | 62 1 2 | 3476 |
| 22 | Regulus | W. | 67 51 0 | 3049 | 69 20 12 | 3044 | 70 49 30 | 3039 | 72 18 55 | 3032 |
| | Spica | W. | 13 48 35 | 3057 | 15 17 37 | 3050 | 16 46 48 | 3041 | 18 16 10 | 3034 |
| | Sun | E. | 55 16 12 | 3457 | 53 55 0 | 3453 | 52 33 43 | 3446 | 51 12 18 | 3441 |
| 23 | Regulus | W. | 79 48 6 | 2996 | 81 18 24 | 2988 | 82 48 52 | 2980 | 84 19 30 | 2971 |
| | Spica | W. | 25 45 18 | 2994 | 27 15 38 | 2986 | 28 46 8 | 2977 | 30 16 50 | 2969 |
| | Sun | E. | 44 23 39 | 3410 | 43 1 34 | 3402 | 41 39 19 | 3396 | 40 16 57 | 3389 |
| 24 | Regulus | W. | 91 55 28 | 2925 | 93 27 15 | 2916 | 94 59 14 | 2906 | 96 31 25 | 2895 |
| | Spica | W. | 37 53 7 | 2922 | 39 24 58 | 2912 | 40 57 2 | 2901 | 42 29 19 | 2892 |
| | Sun | E. | 33 23 13 | 3355 | 32 0 5 | 3349 | 30 36 50 | 3345 | 29 13 29 | 3339 |
| 29 | Sun | W. | 26 26 22 | 2950 | 27 57 38 | 2932 | 29 29 17 | 2917 | 31 1 14 | 2904 |
| | α Pegasi | E. | 52 25 3 | 3034 | 50 55 32 | 3049 | 49 26 20 | 3069 | 47 57 32 | 3082 |
| | Jupiter | E. | 57 13 57 | 2560 | 55 34 7 | 2553 | 53 54 7 | 2546 | 52 13 58 | 2538 |
| | α Arietis | E. | 92 19 27 | 2564 | 90 39 43 | 2556 | 88 59 49 | 2549 | 87 19 43 | 2542 |
| 30 | Sun | W. | 38 45 1 | 2847 | 40 18 28 | 2837 | 41 52 9 | 2828 | 43 26 1 | 2819 |
| | α Pegasi | W. | 40 42 14 | 3274 | 39 17 32 | 3328 | 37 53 53 | 3392 | 36 31 27 | 3464 |
| | Jupiter | E. | 43 50 35 | 2503 | 42 9 26 | 2497 | 40 28 8 | 2489 | 38 46 39 | 2485 |
| | α Arietis | E. | 78 56 48 | 2508 | 77 15 46 | 2502 | 75 34 36 | 2497 | 73 53 18 | 2490 |
| 31 | Sun | W. | 51 18 6 | 2779 | 52 53 2 | 2772 | 54 28 8 | 2766 | 56 3 21 | 2760 |
| | Jupiter | E. | 30 17 16 | 2455 | 28 35 0 | 2449 | 26 52 35 | 2444 | 25 10 2 | 2439 |
| | α Arietis | E. | 65 24 52 | 2466 | 63 42 51 | 2462 | 62 0 44 | 2458 | 60 18 32 | 2454 |
| | Aldebaran | E. | 96 8 10 | 2480 | 94 26 28 | 2474 | 92 44 38 | 2467 | 91 2 39 | 2462 |

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

| Day of the Month. | Star's Name and Position. | | Midnight. | P. L. of Diff. | XVh. | P. L. of Diff. | XXIh. | P. L. of Diff. | XVIIIh. | P. L. of Diff. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | | ° ′ ″ | |
| 16 | Sun | E. | 115 22 31 | 3227 | 113 56 59 | 3242 | 112 31 40 | 3257 | 111 6 38 | 3271 |
| 17 | Aldebaran | W. | 94 38 24 | 3002 | 96 8 34 | 3014 | 97 38 30 | 2026 | 99 8 11 | 3038 |
| | Saturn | W. | 60 22 12 | 2941 | 61 53 39 | 2951 | 63 24 53 | 2961 | 64 55 55 | 2969 |
| | Pollux | W. | 50 57 3 | 2944 | 52 28 26 | 2954 | 53 59 36 | 2965 | 55 30 32 | 2974 |
| | Spica | E. | 39 52 46 | 2942 | 38 21 21 | 2954 | 36 50 10 | 2965 | 35 19 14 | 2975 |
| | Sun | E. | 104 5 30 | 3337 | 102 42 1 | 3350 | 101 18 47 | 3361 | 99 55 46 | 3372 |
| 18 | Saturn | W. | 72 28 20 | 3011 | 73 58 19 | 3018 | 75 28 9 | 3024 | 76 57 52 | 3030 |
| | Pollux | W. | 63 2 17 | 3019 | 64 32 6 | 3026 | 66 1 47 | 3033 | 67 31 19 | 3039 |
| | Regulus | W. | 26 27 18 | 3047 | 27 56 33 | 3052 | 29 25 42 | 3056 | 30 54 46 | 3060 |
| | Spica | E. | 27 47 34 | 3021 | 26 17 47 | 3029 | 24 48 10 | 3035 | 23 18 41 | 3042 |
| | Sun | E. | 93 3 35 | 3420 | 91 41 41 | 3427 | 90 19 55 | 3435 | 88 58 18 | 3442 |
| 19 | Saturn | W. | 84 24 43 | 3054 | 85 53 49 | 3057 | 87 22 51 | 3060 | 88 51 49 | 3062 |
| | Pollux | W. | 74 57 13 | 3064 | 76 26 7 | 3067 | 77 54 57 | 3070 | 79 23 43 | 3073 |
| | Regulus | W. | 38 18 51 | 3078 | 39 47 28 | 3081 | 41 16 1 | 3082 | 42 44 32 | 3083 |
| | Sun | E. | 82 12 2 | 3470 | 80 51 4 | 3473 | 79 30 10 | 3477 | 78 9 20 | 3480 |
| 20 | Saturn | W. | 96 16 8 | 3069 | 97 44 56 | 3068 | 99 13 45 | 3067 | 100 42 35 | 3065 |
| | Pollux | W. | 86 46 59 | 3078 | 88 15 36 | 3078 | 89 44 13 | 3077 | 91 12 51 | 3075 |
| | Regulus | W. | 50 6 48 | 3086 | 51 35 15 | 3086 | 53 3 42 | 3085 | 54 32 10 | 3082 |
| | Sun | E. | 71 25 50 | 3488 | 70 5 12 | 3488 | 68 44 34 | 3487 | 67 23 55 | 3486 |
| 21 | Saturn | W. | 108 7 16 | 3055 | 109 36 21 | 3052 | 111 5 30 | 3047 | 112 34 45 | 3040 |
| | Pollux | W. | 98 36 37 | 3062 | 100 5 33 | 3059 | 101 34 33 | 3054 | 103 3 39 | 3049 |
| | Regulus | W. | 61 55 15 | 3069 | 63 24 3 | 3064 | 64 52 57 | 3060 | 66 21 55 | 3056 |
| | Sun | E. | 60 40 11 | 3473 | 59 19 17 | 3471 | 57 58 20 | 3466 | 56 37 18 | 3463 |
| 22 | Regulus | W. | 73 48 28 | 3026 | 75 18 9 | 3018 | 76 47 59 | 3011 | 78 17 58 | 3004 |
| | Spica | W. | 19 45 40 | 3026 | 21 15 20 | 3018 | 22 45 10 | 3010 | 24 15 10 | 3004 |
| | Sun | E. | 49 50 48 | 3435 | 48 29 11 | 3429 | 47 7 26 | 3423 | 45 45 36 | 3417 |
| 23 | Regulus | W. | 85 50 19 | 2962 | 87 21 19 | 2964 | 88 52 30 | 2944 | 90 23 53 | 2935 |
| | Spica | W. | 31 47 42 | 2969 | 33 18 46 | 2950 | 34 50 1 | 2941 | 36 21 28 | 2931 |
| | Sun | E. | 38 54 28 | 3382 | 37 31 51 | 3375 | 36 9 5 | 3369 | 34 46 13 | 3362 |
| 24 | Regulus | W. | 98 3 50 | 2886 | 99 36 27 | 2875 | 101 9 18 | 2865 | 102 42 22 | 2855 |
| | Spica | W. | 44 1 48 | 2881 | 45 34 31 | 2871 | 47 7 27 | 2860 | 48 40 37 | 2849 |
| | Sun | E. | 27 50 3 | 3336 | 26 26 32 | 3332 | 25 2 58 | 3330 | 23 39 20 | 3327 |
| 29 | Sun | W. | 32 33 29 | 2891 | 34 5 59 | 2879 | 35 38 46 | 2867 | 37 11 47 | 2857 |
| | α Pegasi | E. | 46 29 13 | 3119 | 45 1 26 | 3150 | 43 34 17 | 3186 | 42 7 51 | 3227 |
| | Jupiter | E. | 50 33 37 | 2530 | 48 53 6 | 2524 | 47 12 26 | 2517 | 45 31 35 | 2510 |
| | α Arietis | E. | 85 39 28 | 2535 | 83 59 2 | 2527 | 82 18 27 | 2521 | 80 37 43 | 2513 |
| 30 | Sun | W. | 45 0 4 | 2810 | 46 34 20 | 2802 | 48 8 45 | 2795 | 49 43 20 | 2786 |
| | α Pegasi | W. | 35 10 23 | 3549 | 33 50 53 | 3648 | 32 33 10 | 3763 | 31 17 29 | 3899 |
| | Jupiter | E. | 37 5 4 | 2478 | 35 23 20 | 2472 | 33 41 27 | 2466 | 31 59 25 | 2460 |
| | α Arietis | E. | 72 11 51 | 2485 | 70 30 17 | 2480 | 68 48 36 | 2475 | 67 6 48 | 2470 |
| 31 | Sun | W. | 57 38 43 | 2752 | 59 14 14 | 2745 | 60 49 54 | 2739 | 62 25 42 | 2733 |
| | Jupiter | E. | 23 27 23 | 2434 | 21 44 36 | 2430 | 20 1 44 | 2425 | 18 18 45 | 2421 |
| | α Arietis | E. | 58 36 14 | 2452 | 56 53 53 | 2448 | 55 11 27 | 2445 | 53 28 57 | 2443 |
| | Aldebaran | E. | 89 20 33 | 2456 | 87 38 20 | 2452 | 85 55 59 | 2448 | 84 13 32 | 2443 |

## JANUARY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 15 32 9.97 | 11.292 | −16 8 39.9 | 42.14 | 20 51.4 |
| 2 | 15 36 41.90 | .362 | 16 25 25.0 | 41.52 | 20 52.0 |
| 3 | 15 41 15.33 | .416 | 16 41 52.8 | 40.72 | 20 52.6 |
| 4 | 15 45 50.08 | .477 | 16 58 1.7 | 39.99 | 20 53.3 |
| 5 | 15 50 26.29 | .540 | 17 13 52.7 | 39.23 | 20 54.0 |
| 6 | 15 55 3.99 | 11.601 | 17 29 25.0 | 38.43 | 20 54.7 |
| 7 | 15 59 43.15 | .662 | 17 44 37.6 | 37.59 | 20 55.4 |
| 8 | 16 4 23.78 | .722 | 17 59 29.9 | 36.73 | 20 56.1 |
| 9 | 16 9 5.81 | .780 | 18 14 0.9 | 35.83 | 20 56.9 |
| 10 | 16 13 49.25 | .838 | 18 28 9.7 | 34.89 | 20 57.7 |
| 11 | 16 18 34.05 | 11.894 | 18 41 55.6 | 33.91 | 20 58.5 |
| 12 | 16 23 20.19 | 11.952 | 18 55 17.7 | 32.91 | 20 59.4 |
| 13 | 16 28 7.70 | 12.007 | 19 8 15.5 | 31.88 | 21 0.2 |
| 14 | 16 32 56.52 | .061 | 19 20 48.1 | 30.82 | 21 1.1 |
| 15 | 16 37 46.61 | .112 | 19 32 54.7 | 29.72 | 21 2.1 |
| 16 | 16 42 37.93 | 12.165 | 19 44 34.7 | 28.58 | 21 3.0 |
| 17 | 16 47 30.50 | .215 | 19 55 47.2 | 27.44 | 21 3.9 |
| 18 | 16 52 24.26 | .265 | 20 6 31.8 | 26.26 | 21 4.9 |
| 19 | 16 57 19.20 | .318 | 20 16 47.6 | 25.04 | 21 5.9 |
| 20 | 17 2 15.28 | .360 | 20 26 34.1 | 23.81 | 21 6.9 |
| 21 | 17 7 12.46 | 12.405 | 20 35 50.6 | 22.55 | 21 8.0 |
| 22 | 17 12 10.70 | .448 | 20 44 36.5 | 21.26 | 21 9.0 |
| 23 | 17 17 9.98 | .491 | 20 52 51.3 | 19.96 | 21 10.1 |
| 24 | 17 22 10.27 | .532 | 21 0 34.4 | 18.62 | 21 11.1 |
| 25 | 17 27 11.51 | .570 | 21 7 45.2 | 17.26 | 21 12.2 |
| 26 | 17 32 13.64 | 12.607 | 21 14 23.4 | 15.90 | 21 13.3 |
| 27 | 17 37 16.66 | .642 | 21 20 28.1 | 14.49 | 21 14.5 |
| 28 | 17 42 20.49 | .675 | 21 25 59.0 | 13.07 | 21 15.6 |
| 29 | 17 47 25.08 | .706 | 21 30 55.6 | 11.64 | 21 16.7 |
| 30 | 17 52 30.38 | .735 | 21 35 17.6 | 10.16 | 21 17.9 |
| 31 | 17 57 36.34 | 12.761 | 21 39 4.4 | 8.71 | 21 19.1 |
| 32 | 18 2 42.92 | 12.785 | −21 42 15.9 | 7.23 | 21 20.3 |

| Day of Month, 1st. | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|
| Semidiam. ″ 10.2 | ″ 9.8 | ″ 9.4 | ″ 9.0 | ″ 8.7 | ″ 8.4 | ″ 8.1 |
| Hor. Par. 10.3 | 9.9 | 9.5 | 9.1 | 8.8 | 8.5 | 8.2 |

## FEBRUARY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 18 2 42.92 | 12.785 | −21 42 15.9 | 7.23 | 21 20.3 |
| 2 | 18 7 50.04 | .807 | 21 44 51.6 | 5.76 | 21 21.5 |
| 3 | 18 12 57.66 | .826 | 21 46 51.4 | 4.23 | 21 22.6 |
| 4 | 18 18 5.71 | .843 | 21 48 14.7 | 2.71 | 21 23.8 |
| 5 | 18 23 14.12 | .858 | 21 49 1.5 | −1.18 | 21 25.0 |
| 6 | 18 28 22.88 | 12.870 | 21 49 11.6 | +0.36 | 21 26 1 |
| 7 | 18 33 31.90 | .881 | 21 48 44.6 | 1.91 | 21 27.4 |
| 8 | 18 38 41.13 | .886 | 21 47 40.7 | 3.43 | 21 28.6 |
| 9 | 18 43 50.50 | .892 | 21 45 59.8 | 4.98 | 21 29.8 |
| 10 | 18 48 59.97 | .896 | 21 43 41.5 | 6.54 | 21 31.0 |
| 11 | 18 54 9.50 | 12.896 | 21 40 45.9 | 8.09 | 21 32.2 |
| 12 | 18 57 19.01 | .894 | 21 37 13.1 | 9.64 | 21 33.4 |
| 13 | 19 4 28.44 | .890 | 21 33 3.0 | 11.19 | 21 34.7 |
| 14 | 19 9 37.76 | .885 | 21 28 15.8 | 12.74 | 21 35.9 |
| 15 | 19 14 46.92 | .877 | 21 22 51.4 | 14.28 | 21 37.2 |
| 16 | 19 19 55.87 | 12.867 | 21 16 50.2 | 15.82 | 21 38.4 |
| 17 | 19 25 4.56 | .856 | 21 10 12.0 | 17.36 | 21 39.6 |
| 18 | 19 30 12.96 | .843 | 21 2 57.0 | 18.88 | 21 40.8 |
| 19 | 19 35 21.02 | .827 | 20 55 5.5 | 20.40 | 21 42.0 |
| 20 | 19 40 28.69 | .810 | 20 46 37.6 | 21.92 | 21 43.1 |
| 21 | 19 45 35.92 | 12.791 | 20 37 33.5 | 23.42 | 21 44.2 |
| 22 | 19 50 42.68 | .771 | 20 27 53.5 | 24.91 | 21 45.4 |
| 23 | 19 55 48.93 | .749 | 20 17 38.0 | 26.39 | 21 46.6 |
| 24 | 20 0 54.65 | .726 | 20 6 47.1 | 27.85 | 21 47.8 |
| 25 | 20 5 59.80 | .700 | 19 55 21.2 | 29.30 | 21 48.9 |
| 26 | 20 11 4.31 | 12.674 | 19 43 20.7 | 30.74 | 21 50.0 |
| 27 | 20 16 8.16 | .646 | 19 30 45.9 | 32.15 | 21 51.1 |
| 28 | 20 21 11.33 | .617 | 19 17 37.3 | 33.55 | 21 52.2 |
| 29 | 20 26 13.80 | .587 | 19 3 55.3 | 34.94 | 21 53.3 |
| 30 | 20 31 15.51 | .555 | 18 49 40.1 | 36.31 | 21 54.4 |
| 31 | 20 36 16.45 | 12.522 | 18 34 52.4 | 37.66 | 21 55.4 |
| 32 | 20 41 16.57 | 12.489 | −18 19 32.6 | 38.98 | 21 56.5 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. | 30th. |
|---|---|---|---|---|---|---|
| Semidiameter | ″ 7.9 | ″ 7.6 | ″ 7.4 | ″ 7.2 | ″ 7.0 | ″ 6.8 |
| Hor. Parallax | 7.9 | 7.7 | 7.5 | 7.3 | 7.1 | 6.9 |

## MARCH.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 20 31 15.51 | 12.555 | −18 49 40.1 | 36.31 | 21 54.4 |
| 2 | 20 36 16.45 | .522 | 18 34 52.4 | 37.66 | 21 55.4 |
| 3 | 20 41 16.57 | .489 | 18 19 32.6 | 38.98 | 21 56.5 |
| 4 | 20 46 15.86 | .452 | 18 3 41.4 | 40.28 | 21 57.5 |
| 5 | 20 51 14.31 | .418 | 17 47 19.1 | 41.56 | 21 58.5 |
| 6 | 20 56 11.91 | 12.381 | 17 30 26.4 | 42.81 | 21 59.5 |
| 7 | 21 1 8.60 | .342 | 17 13 3.8 | 44.05 | 22 0.5 |
| 8 | 21 6 4.39 | .305 | 16 55 11.9 | 45.26 | 22 1.5 |
| 9 | 21 10 59.27 | .268 | 16 36 51.2 | 46.45 | 22 2.4 |
| 10 | 21 15 53.25 | .229 | 16 18 2.4 | 47.61 | 22 3.3 |
| 11 | 21 20 46.27 | 12.189 | 15 58 46.0 | 48.71 | 22 4.2 |
| 12 | 21 25 38.34 | .150 | 15 39 2.7 | 49.85 | 22 5.2 |
| 13 | 21 30 29.48 | .113 | 15 18 53.1 | 50.94 | 22 6.1 |
| 14 | 21 35 19.71 | .074 | 14 58 17.7 | 51.99 | 22 7.0 |
| 15 | 21 40 9.01 | 12.034 | 14 37 17.3 | 53.03 | 22 7.8 |
| 16 | 21 44 57.38 | 11.994 | 14 15 52.4 | 54.03 | 22 8.7 |
| 17 | 21 49 44.83 | .958 | 13 54 3.7 | 55.01 | 22 9.5 |
| 18 | 21 54 31.39 | .921 | 13 31 51.8 | 55.95 | 22 10.3 |
| 19 | 21 59 17.03 | .883 | 13 9 17.4 | 56.89 | 22 11.1 |
| 20 | 22 4 1.77 | .847 | 12 46 21.1 | 57.79 | 22 11.9 |
| 21 | 22 8 45.67 | 11.812 | 12 23 3.6 | 58.66 | 22 12.7 |
| 22 | 22 13 28.74 | .777 | 11 59 25.4 | 59.51 | 22 13.5 |
| 23 | 22 18 10.97 | .744 | 11 35 27.2 | 60.32 | 22 14.2 |
| 24 | 22 22 52.38 | .709 | 11 11 9.8 | 61.12 | 22 14.9 |
| 25 | 22 27 32.99 | .676 | 10 46 33.6 | 61.88 | 22 15.8 |
| 26 | 22 32 12.84 | 11.644 | 10 21 39.4 | 62.62 | 22 16.5 |
| 27 | 22 36 51.92 | .613 | 9 56 28.0 | 63.32 | 22 17.2 |
| 28 | 22 41 30.26 | .583 | 9 30 59.9 | 64.00 | 22 17.8 |
| 29 | 22 46 7.91 | .554 | 9 5 16.0 | 64.64 | 22 18.5 |
| 30 | 22 50 44.89 | .526 | 8 39 16.8 | 65.27 | 22 19.2 |
| 31 | 22 55 21.19 | 11.499 | 8 13 2.9 | 65.87 | 22 19.8 |
| 32 | 22 59 56.85 | 11.473 | − 7 46 35.1 | 66.43 | 22 20.5 |

| Day of the Month, | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 6.7 | 6.5 | 6.4 | 6.3 | 6.1 | 6.0 |
| Hor. Parallax | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 |

## APRIL.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 22 59 56.85 | 11.473 | −7 46 35.1 | 66.43 | 22 20.5 |
| 2 | 23 4 31.91 | .449 | 7 19 54.2 | 66.96 | 22 21.1 |
| 3 | 23 9 6.40 | .425 | 6 53 0.8 | 67.[illegible] | 22 21.7 |
| 4 | 23 13 40.32 | .402 | 6 25 55.7 | 67.94 | 22 22.3 |
| 5 | 23 18 13.71 | .380 | 5 58 39.6 | 68.39 | 22 22.9 |
| 6 | 23 22 46.61 | 11.361 | 5 31 13.0 | 68.81 | 22 23.5 |
| 7 | 23 27 19.05 | .342 | 5 3 36.8 | 69.20 | 22 24.1 |
| 8 | 23 31 51.05 | .324 | 4 35 51.6 | 69.55 | 22 24.7 |
| 9 | 23 36 22.64 | .307 | 4 7 58.2 | 69.88 | 22 25.3 |
| 10 | 23 40 53.86 | .292 | 3 39 57.2 | 70.19 | 22 25.9 |
| 11 | 23 45 24.76 | 11.281 | 3 11 49.3 | 70.46 | 22 26.4 |
| 12 | 23 49 55.35 | .269 | 2 43 35.2 | 70.70 | 22 27.0 |
| 13 | 23 54 25.67 | .258 | 2 15 15.6 | 70.92 | 22 27.5 |
| 14 | 23 58 55.77 | .250 | 1 46 51.0 | 71.11 | 22 28.1 |
| 15 | 0 3 25.70 | .242 | 1 18 22.2 | 71.27 | 22 28.7 |
| 16 | 0 7 55.48 | 11.238 | 0 49 49.9 | 71.40 | 22 29.2 |
| 17 | 0 12 25.16 | .235 | −0 21 14.7 | 71.51 | 22 29.8 |
| 18 | 0 16 54.76 | .231 | +0 7 22.7 | 71.59 | 22 30.3 |
| 19 | 0 21 24.34 | .231 | 0 36 1.6 | 71.64 | 22 30.9 |
| 20 | 0 25 53.91 | .231 | 1 4 41.4 | 71.66 | 22 31.4 |
| 21 | 0 30 23.52 | 11.236 | 1 33 21.4 | 71.66 | 22 32.0 |
| 22 | 0 34 53.24 | .242 | 2 2 1.0 | 71.63 | 22 32.5 |
| 23 | 0 39 23.10 | .248 | 2 30 39.5 | 71.57 | 22 33.1 |
| 24 | 0 43 53.14 | .256 | 2 59 16.2 | 71.48 | 22 33.7 |
| 25 | 0 48 23.39 | .265 | 3 27 50.4 | 71.36 | 22 34.2 |
| 26 | 0 52 53.88 | 11.276 | 3 56 21.5 | 71.22 | 22 34.8 |
| 27 | 0 57 24.65 | .286 | 4 24 48.8 | 71.04 | 22 35.4 |
| 28 | 1 1 55.73 | .302 | 4 53 11.5 | 70.83 | 22 35.9 |
| 29 | 1 6 27.17 | .318 | 5 21 28.9 | 70.60 | 22 36.5 |
| 30 | 1 10 59.01 | .335 | 5 49 40.3 | 70.34 | 22 37.1 |
| 31 | 1 15 31.27 | 11.354 | 6 17 45.2 | 70.05 | 22 37.7 |
| 32 | 1 20 4.01 | 11.374 | +6 45 42.6 | 69.72 | 22 38.3 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. | 30th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.5 |
| Hor. Parallax | 5.9 | 5.8 | 5.7 | 5.7 | 5.6 | 5.5 |

## MAY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 1 15 31.27 | 11.354 | + 6 17 45.2 | 70.05 | 22 37.7 |
| 2 | 1 20 4.01 | .374 | 6 45 42.6 | 69.72 | 22 38.3 |
| 3 | 1 24 37.26 | .396 | 7 13 31.9 | 69.37 | 22 39.0 |
| 4 | 1 29 11.02 | .418 | 7 41 12.5 | 68.99 | 22 39.6 |
| 5 | 1 33 45.33 | .442 | 8 8 43.6 | 68.59 | 22 40.2 |
| 6 | 1 38 20.25 | 11.468 | 8 36 4.4 | 68.14 | 22 40.9 |
| 7 | 1 42 55.81 | .496 | 9 3 14.2 | 67.67 | 22 41.6 |
| 8 | 1 47 32.02 | .523 | 9 30 12.3 | 67.16 | 22 42.2 |
| 9 | 1 52 8.91 | .552 | 9 56 58.1 | 66.63 | 22 42.9 |
| 10 | 1 56 46.53 | .583 | 10 23 30.7 | 66.07 | 22 43.6 |
| 11 | 2 1 24.92 | 11.616 | 10 49 49.4 | 65.48 | 22 44.3 |
| 12 | 2 6 4.10 | .648 | 11 15 53.8 | 64.87 | 22 44.9 |
| 13 | 2 10 44.10 | .684 | 11 41 43.0 | 64.22 | 22 45.7 |
| 14 | 2 15 24.93 | .719 | 12 7 16.2 | 63.53 | 22 46.5 |
| 15 | 2 20 6.63 | .756 | 12 32 32.6 | 62.82 | 22 47.2 |
| 16 | 2 24 49.24 | 11.795 | 12 57 31.8 | 62.09 | 22 48.0 |
| 17 | 2 29 32.78 | .834 | 13 22 13.1 | 61.33 | 22 48.8 |
| 18 | 2 34 17.28 | .875 | 13 46 35.5 | 60.52 | 22 49.6 |
| 19 | 2 39 2.76 | .915 | 14 10 38.4 | 59.68 | 22 50.5 |
| 20 | 2 43 49.22 | 11.956 | 14 34 21.2 | 58.85 | 22 51.3 |
| 21 | 2 48 36.70 | 12.001 | 14 57 43.1 | 57.98 | 22 52.2 |
| 22 | 2 53 25.25 | .045 | 15 20 43.5 | 57.05 | 22 53.1 |
| 23 | 2 58 14.89 | .091 | 15 43 21.7 | 56.11 | 22 54.0 |
| 24 | 3 3 5.60 | .135 | 16 5 36.7 | 55.13 | 22 54.9 |
| 25 | 3 7 57.40 | .180 | 16 27 27.8 | 54.13 | 22 55.8 |
| 26 | 3 12 50.30 | 12.226 | 16 48 54.8 | 53.10 | 22 56.8 |
| 27 | 3 17 44.29 | .274 | 17 9 56.8 | 52.04 | 22 57.8 |
| 28 | 3 22 39.44 | .321 | 17 30 32.8 | 50.94 | 22 58.8 |
| 29 | 3 27 35.73 | .368 | 17 50 42.1 | 49.82 | 22 59.8 |
| 30 | 3 32 33.12 | .414 | 18 10 24.0 | 48.66 | 23 0.8 |
| 31 | 3 37 31.62 | 12.461 | 18 29 37.9 | 47.48 | 23 1.9 |
| 32 | 3 42 31.27 | 12.509 | +18 48 23.2 | 46.28 | 23 3.0 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. | 30th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.4 | 5.3 | 5.3 | 5.2 | 5.2 | 5.1 |
| Hor. Parallax | 5.4 | 5.4 | 5.3 | 5.2 | 5.2 | 5.2 |

## JUNE.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 3 42 31.27 | 12.509 | +18 48 23.2 | 46.28 | 23 3.0 |
| 2 | 3 47 32.03 | .555 | 19 6 39.2 | 45.04 | 23 4.1 |
| 3 | 3 52 33.95 | .602 | 19 24 25.0 | 43.77 | 23 5.2 |
| 4 | 3 57 36.95 | .648 | 19 41 40.0 | 42.47 | 23 6.3 |
| 5 | 4 2 41.05 | .694 | 19 58 23.7 | 41.16 | 23 7.5 |
| 6 | 4 7 46.25 | 12.738 | 20 14 35.5 | 39.81 | 23 8.6 |
| 7 | 4 12 52.48 | .781 | 20 30 14.4 | 38.43 | 23 9.8 |
| 8 | 4 17 59.73 | .824 | 20 45 20.0 | 37.02 | 23 11.0 |
| 9 | 4 23 8.03 | .866 | 20 59 51.6 | 35.60 | 23 12.2 |
| 10 | 4 28 17.34 | .908 | 21 13 48.8 | 34.15 | 23 13.4 |
| 11 | 4 33 27.63 | 12.948 | 21 27 11.0 | 32.63 | 23 14.6 |
| 12 | 4 38 38.86 | 12.987 | 21 39 57.5 | 31.18 | 23 15.9 |
| 13 | 4 43 51.02 | 13.025 | 21 52 7.9 | 29.67 | 23 17.2 |
| 14 | 4 49 4.08 | .062 | 22 3 41.7 | 28.13 | 23 18.5 |
| 15 | 4 54 18.01 | .097 | 22 14 38.3 | 26.57 | 23 19.8 |
| 16 | 4 59 32.77 | 13.132 | 22 24 57.3 | 24.99 | 23 21.1 |
| 17 | 5 4 48.32 | .164 | 22 34 38.1 | 23.40 | 23 22.4 |
| 18 | 5 10 4.63 | .194 | 22 43 40.3 | 21.78 | 23 23.7 |
| 19 | 5 15 21.65 | .223 | 22 52 3.6 | 20.15 | 23 25.1 |
| 20 | 5 20 39.33 | .251 | 22 59 47.6 | 18.51 | 23 26.5 |
| 21 | 5 25 57.69 | 13.278 | 23 6 51.9 | 16.84 | 23 27.8 |
| 22 | 5 31 16.68 | .301 | 23 13 16.1 | 15.17 | 23 29.2 |
| 23 | 5 36 36.15 | .320 | 23 19 0.0 | 13.48 | 23 30.6 |
| 24 | 5 41 56.06 | .339 | 23 24 3.2 | 11.78 | 23 32.0 |
| 25 | 5 47 16.44 | .357 | 23 28 25.4 | 10.06 | 23 33.4 |
| 26 | 5 52 37.23 | 13.373 | 23 32 6.2 | 8.34 | 23 34.8 |
| 27 | 5 57 58.34 | .385 | 23 35 5.7 | 6.61 | 23 36.2 |
| 28 | 6 3 19.72 | .395 | 23 37 23.7 | 4.87 | 23 37.7 |
| 29 | 6 8 41.33 | .404 | 23 38 59.8 | 3.13 | 23 39.1 |
| 30 | 6 14 3.11 | .409 | 23 39 54.0 | 1.38 | 23 40.5 |
| 31 | 6 19 24.98 | 13.412 | 23 40 6.3 | 0.36 | 23 42.0 |
| 32 | 6 24 46.88 | 13.412 | +23 39 36.7 | 2.12 | 23 43.4 |

| Day of the Month, | 4th. | 9th. | 14th. | 19th. | 24th. | 29th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.1 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 |
| Hor. Parallax | 5.1 | 5.1 | 5.0 | 5.0 | 5.0 | 5.0 |

JULY.

| Day of the Month. | GREENWICH MEAN TIME.<br>Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 19 24.98 | 13.412 | +23 40 6.3 | −0.36 | 23 42.9 |
| 2 | 6 24 46.88 | .412 | 23 39 36.7 | 2.12 | 23 43.4 |
| 3 | 6 30 8.77 | .410 | 23 38 24.7 | 3.88 | 23 44.8 |
| 4 | 6 35 30.59 | .405 | 23 36 30.5 | 5.63 | 23 46.2 |
| 5 | 6 40 52.24 | .397 | 23 33 54.4 | 7.37 | 23 47.6 |
| 6 | 6 46 13.68 | 13.388 | 23 30 36.6 | 9.12 | 23 49.1 |
| 7 | 6 51 34.86 | .376 | 23 26 36.7 | 10.87 | 23 50.5 |
| 8 | 6 56 55.72 | .361 | 23 21 55.0 | 12.60 | 23 51.9 |
| 9 | 7 2 16.22 | .345 | 23 16 31.8 | 14.33 | 23 53.3 |
| 10 | 7 7 36.30 | .327 | 23 10 27.1 | 16.05 | 23 54.6 |
| 11 | 7 12 55.92 | 13.306 | 23 3 41.3 | 17.76 | 23 56.0 |
| 12 | 7 18 15.01 | .283 | 22 56 14.5 | 19.46 | 23 57.4 |
| 13 | 7 23 33.52 | .257 | 22 48 7.3 | 21.14 | 23 58.7 |
| 14 | 7 28 51.37 | .230 | 22 39 19.6 | 22.82 | |
| 15 | 7 34 8.59 | .203 | 22 29 51.9 | 24.48 | 0 0.1 |
| 16 | 7 39 25.13 | 13.172 | 22 19 44.6 | 26.13 | 0 1.4 |
| 17 | 7 44 40.87 | .140 | 22 8 57.8 | 27.76 | 0 2.7 |
| 18 | 7 49 55.83 | .106 | 21 57 32.0 | 29.37 | 0 4.0 |
| 19 | 7 55 9.95 | .070 | 21 45 27.9 | 30.96 | 0 5.3 |
| 20 | 8 0 23.20 | 13.033 | 21 32 45.8 | 32.54 | 0 6.6 |
| 21 | 8 5 35.56 | 12.996 | 21 19 26.1 | 34.10 | 0 7.8 |
| 22 | 8 10 47.00 | .957 | 21 5 29.2 | 35.63 | 0 9.1 |
| 23 | 8 15 57.48 | .916 | 20 50 55.7 | 37.15 | 0 10.3 |
| 24 | 8 21 6.99 | .877 | 20 35 46.0 | 38.64 | 0 11.5 |
| 25 | 8 26 15.51 | .833 | 20 20 0.8 | 40.11 | 0 12.7 |
| 26 | 8 31 22.98 | 12.789 | 20 3 40.5 | 41.56 | 0 13.9 |
| 27 | 8 36 29.41 | .746 | 19 46 45.8 | 42.98 | 0 15.0 |
| 28 | 8 41 34.78 | .701 | 19 29 17.2 | 44.39 | 0 16.2 |
| 29 | 8 46 39.07 | .656 | 19 11 15.4 | 45.75 | 0 17.3 |
| 30 | 8 51 42.27 | .610 | 18 52 41.1 | 47.09 | 0 18.4 |
| 31 | 8 56 44.34 | 12.563 | 18 33 34.7 | 48.42 | 0 19.5 |
| 32 | 9 1 45.28 | 12.516 | +18 13 56.9 | 49.71 | 0 20.6 |

AUGUST.

| Day of the Month. | GREENWICH MEAN TIME.<br>Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 9 1 45.28 | 12.516 | +18 13 56.9 | 49.71 | 0 20.7 |
| 2 | 9 6 45.10 | .470 | 17 53 48.5 | 50.98 | 0 21.8 |
| 3 | 9 11 43.81 | .422 | 17 33 10.1 | 52.21 | 0 22.8 |
| 4 | 9 16 41.37 | .374 | 17 12 2.3 | 53.40 | 0 23.9 |
| 5 | 9 21 37.79 | .327 | 16 50 25.9 | 54.60 | 0 24.9 |
| 6 | 9 26 33.07 | 12.280 | 16 28 21.6 | 55.74 | 0 25.9 |
| 7 | 9 31 27.23 | .233 | 16 5 50.2 | 56.84 | 0 26.8 |
| 8 | 9 36 20.26 | .186 | 15 42 52.2 | 57.95 | 0 27.7 |
| 9 | 9 41 12.18 | .140 | 15 19 28.5 | 59.01 | 0 28.6 |
| 10 | 9 46 2.99 | .094 | 14 55 39.7 | 60.04 | 0 29.6 |
| 11 | 9 50 52.71 | 12.049 | 14 31 26.6 | 61.04 | 0 30.4 |
| 12 | 9 55 41.36 | 12.005 | 14 6 49.8 | 62.01 | 0 31.3 |
| 13 | 10 0 28.96 | 11.962 | 13 41 50.1 | 62.95 | 0 32.1 |
| 14 | 10 5 15.53 | .919 | 13 16 28.2 | 63.86 | 0 33.0 |
| 15 | 10 10 1.09 | .877 | 12 50 44.8 | 64.74 | 0 33.8 |
| 16 | 10 14 45.65 | 11.836 | 12 24 40.8 | 65.58 | 0 34.6 |
| 17 | 10 19 29.24 | .797 | 11 58 16.8 | 66.41 | 0 35.3 |
| 18 | 10 24 11.91 | .759 | 11 31 33.3 | 67.20 | 0 36.0 |
| 19 | 10 28 53.69 | .722 | 11 4 31.1 | 67.96 | 0 36.8 |
| 20 | 10 33 34.58 | .686 | 10 37 11.1 | 68.69 | 0 37.6 |
| 21 | 10 38 14.63 | 11.652 | 10 9 34.0 | 69.40 | 0 38.3 |
| 22 | 10 42 53.86 | .618 | 9 41 40.4 | 70.06 | 0 39.1 |
| 23 | 10 47 32.30 | .586 | 9 13 31.1 | 70.70 | 0 39.7 |
| 24 | 10 52 10.00 | .556 | 8 45 6.7 | 71.31 | 0 40.4 |
| 25 | 10 56 46.99 | .527 | 8 16 28.0 | 71.89 | 0 41.1 |
| 26 | 11 1 23.30 | 11.499 | 7 47 35.8 | 72.44 | 0 41.8 |
| 27 | 11 5 58.96 | .473 | 7 18 30.8 | 72.96 | 0 42.4 |
| 28 | 11 10 34.00 | .447 | 6 49 13.7 | 73.46 | 0 43.1 |
| 29 | 11 15 8.45 | .425 | 6 19 45.4 | 73.91 | 0 43.7 |
| 30 | 11 19 42.38 | .408 | 5 50 6.3 | 74.33 | 0 44.3 |
| 31 | 11 24 15.81 | 11.383 | 5 20 17.3 | 74.73 | 0 44.9 |
| 32 | 11 28 48.77 | 11.364 | + 4 50 19.3 | 75.09 | 0 45.5 |

| Day of the Month, | 4th. | 9th. | 14th. | 19th. | 24th. | 29th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| Hor. Parallax | 5.0 | 5.0 | 4.9 | 4.9 | 4.9 | 5.0 |

| Day of the Month, | 3d. | 8th. | 13th. | 18th. | 23d. | 28th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 4.9 | 4.9 | 5.0 | 5.0 | 5.0 | 5.1 |
| Hor. Parallax | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 |

# VENUS, 1856.

## SEPTEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 11 28 48.77 | 11.364 | + 4 50 19.3 | 75.09 | 0 45.5 |
| 2 | 11 33 21.29 | .347 | 4 20 12.9 | 75.42 | 0 46.1 |
| 3 | 11 37 53.43 | .332 | 3 49 59.0 | 75.72 | 0 46.7 |
| 4 | 11 42 25.21 | .317 | 3 19 38.2 | 75.99 | 0 47.3 |
| 5 | 11 46 56.68 | .305 | 2 49. 11.2 | 76.23 | 0 47.9 |
| 6 | 11 51 27.86 | 11.294 | 2 18 38.9 | 76.44 | 0 48.5 |
| 7 | 11 55 58.82 | .286 | 1 48 1.8 | 76.62 | 0 49.0 |
| 8 | 12 0 29.60 | .279 | 1 17 20.8 | 76.77 | 0 49.6 |
| 9 | 12 5 0.21 | .273 | 0 46 36.6 | 76.90 | 0 50.2 |
| 10 | 12 9 30.71 | .269 | + 0 15 50.0 | 76.98 | 0 50.7 |
| 11 | 12 14 1.14 | 11.268 | − 0 14 58.3 | 77.03 | 0 51.3 |
| 12 | 12 18 31.56 | .268 | 0 45 47.6 | 77.06 | 0 51.9 |
| 13 | 12 23 2.01 | .270 | 1 16 37.3 | 77.06 | 0 52.4 |
| 14 | 12 27 32.53 | .274 | 1 47 26.7 | 77.03 | 0 53.0 |
| 15 | 12 32 3.16 | .280 | 2 18 14.9 | 76.97 | 0 53.6 |
| 16 | 12 36 33.94 | 11.287 | 2 49 1.3 | 76.88 | 0 54.1 |
| 17 | 12 41 4.92 | .296 | 3 19 45.1 | 76.76 | 0 54.7 |
| 18 | 12 45 36.15 | .307 | 3 50 25.7 | 76.60 | 0 55.3 |
| 19 | 12 50 7.69 | .321 | 4 21 2.2 | 76.43 | 0 55.9 |
| 20 | 12 54 39.57 | .336 | 4 51 34.0 | 76.21 | 0 56.5 |
| 21 | 12 59 11.82 | 11.352 | 5 22 0.4 | 75.97 | 0 57.1 |
| 22 | 13 3 44.48 | .371 | 5 52 20.5 | 75.70 | 0 57.7 |
| 23 | 13 8 17.61 | .391 | 6 22 33.8 | 75.40 | 0 58.3 |
| 24 | 13 12 51.26 | .414 | 6 52 39.5 | 75.06 | 0 58.9 |
| 25 | 13 17 25.46 | .437 | 7 22 36.7 | 74.69 | 0 59.5 |
| 26 | 13 22 0.24 | 11.462 | 7 52 24.7 | 74.30 | 1 0.2 |
| 27 | 13 26 35.66 | .490 | 8 22 2.7 | 73.86 | 1 0.8 |
| 28 | 13 31 11.75 | .518 | 8 51 30.0 | 73.40 | 1 1.5 |
| 29 | 13 35 48.52 | .547 | 9 20 45.8 | 72.90 | 1 2 2 |
| 30 | 13 40 26.02 | .579 | 9 49 49.3 | 72.37 | 1 2.8 |
| 31 | 13 45 4.30 | 11.612 | 10 18 39.6 | 71.80 | 1 3.4 |
| 32 | 13 49 43.39 | 11.646 | −10 47 15.9 | 71.21 | 1 4.2 |

| Day of the Month, | 2d. | 7th. | 12th. | 17th. | 22d. | 27th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.1 | 5.1 | 5.2 | 5.2 | 5.3 | 5.3 |
| Hor. Parallax | 5.1 | 5.2 | 5.2 | 5.3 | 5.3 | 5.4 |

## OCTOBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 13 45 4.30 | 11.612 | −10 18 39.6 | 71.80 | 1 3.4 |
| 2 | 13 49 43.39 | .646 | 10 47 15.9 | 71.21 | 1 4.2 |
| 3 | 13 54 23.33 | .681 | 11 15 37.8 | 70.60 | 1 4.9 |
| 4 | 13 59 4.14 | .720 | 11 43 44.5 | 69.94 | 1 5.6 |
| 5 | 14 3 45.85 | .757 | 12 11 34.8 | 69.24 | 1 6.4 |
| 6 | 14 8 28.49 | 11.797 | 12 39 8.0 | 68.51 | 1 7.2 |
| 7 | 14 13 12.09 | .837 | 13 6 23.3 | 67.75 | 1 7.9 |
| 8 | 14 17 56.68 | .879 | 13 33 20.0 | 66.96 | 1 8.7 |
| 9 | 14 22 42.30 | .923 | 13 59 57.4 | 66.14 | 1 9.6 |
| 10 | 14 27 28.97 | 11.967 | 14 26 14.6 | 65.30 | 1 10.4 |
| 11 | 14 32 16.70 | 12.011 | 14 52 10.8 | 64.39 | 1 11.3 |
| 12 | 14 37 5.52 | .058 | 15 17 45.1 | 63.46 | 1 12.1 |
| 13 | 14 41 55.48 | .106 | 15 42 57.0 | 62.51 | 1 13.0 |
| 14 | 14 46 46.59 | .153 | 16 7 45.6 | 61.52 | 1 13.9 |
| 15 | 14 51 38.83 | .201 | 16 32 10.2 | 60.51 | 1 14.9 |
| 16 | 14 56 32.24 | 12.250 | 16 56 9.9 | 59.45 | 1 15.9 |
| 17 | 15 1 26.85 | .301 | 17 19 43.9 | 58.37 | 1 16.8 |
| 18 | 15 6 22.67 | .352 | 17 42 51.5 | 57.25 | 1 17.8 |
| 19 | 15 11 19.76 | .404 | 18 5 32.0 | 56.11 | 1 18.8 |
| 20 | 15 16 18.07 | .456 | 18 27 44.6 | 54.93 | 1 19.8 |
| 21 | 15 21 17.61 | 12.506 | 18 49 28.4 | 53.71 | 1 20.9 |
| 22 | 15 26 18.37 | .557 | 19 10 42.7 | 52.46 | 1 22.0 |
| 23 | 15 31 20.40 | .611 | 19 31 26.7 | 51.18 | 1 23.1 |
| 24 | 15 36 23.70 | .662 | 19 51 39.6 | 49.88 | 1 24.2 |
| 25 | 15 41 28.23 | .714 | 20 11 20.9 | 48.54 | 1 25.4 |
| 26 | 15 46 33.98 | 12.765 | 20 30 29.7 | 47.17 | 1 26.5 |
| 27 | 15 51 40.95 | .815 | 20 49 5.3 | 45.77 | 1 27.7 |
| 28 | 15 56 49.11 | .865 | 21 7 6.9 | 44.34 | 1 28.9 |
| 29 | 16 1 58.49 | .915 | 21 24 33.5 | 42.87 | 1 30.1 |
| 30 | 16 7 9.06 | 12.964 | 21 41 24.8 | 41.38 | 1 31.3 |
| 31 | 16 12 20.75 | 13.010 | 21 57 40.0 | 39.87 | 1 32.5 |
| 32 | 16 17 33.53 | 13.055 | −22 13 18.4 | 38.32 | 1 33.8 |

| Day of the Month, | 2d. | 7th. | 12th. | 17th. | 22d. | 27th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.4 | 5.5 | 5.5 | 5.6 | 5.7 | 5.8 |
| Hor. Parallax | 5.4 | 5.5 | 5.6 | 5.6 | 5.7 | 5.8 |

# VENUS, 1856.

## NOVEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 16 17 33.53 | 13.055 | −22 13 18.4 | 38.32 | 1 33.8 |
| 2 | 16 22 47.41 | .100 | 22 28 19.3 | 36.74 | 1 35.2 |
| 3 | 16 28 2.36 | .145 | 22 42 42.1 | 35.14 | 1 36.5 |
| 4 | 16 33 18.32 | .185 | 22 56 26.2 | 33.52 | 1 37.8 |
| 5 | 16 38 35.25 | .225 | 23 9 31.0 | 31.87 | 1 39.1 |
| 6 | 16 43 53.13 | 13.263 | 23 21 55.9 | 30.20 | 1 40.4 |
| 7 | 16 49 11.89 | .299 | 23 33 40.5 | 28.52 | 1 41.8 |
| 8 | 16 54 31.52 | .335 | 23 44 44.0 | 26.78 | 1 43.2 |
| 9 | 16 59 51.95 | .367 | 23 55 6.1 | 25.05 | 1 44.6 |
| 10 | 17 5 13.13 | .397 | 24 4 46.3 | 23.30 | 1 46.0 |
| 11 | 17 10 34.99 | 13.424 | 24 13 44.3 | 21.52 | 1 47.4 |
| 12 | 17 15 57.52 | .451 | 24 21 59.4 | 19.73 | 1 48.9 |
| 13 | 17 21 20.66 | .474 | 24 29 31.4 | 17.93 | 1 50.3 |
| 14 | 17 26 44.31 | .495 | 24 36 20.0 | 16.11 | 1 51.8 |
| 15 | 17 32 8.42 | .513 | 24 42 24.9 | 14.28 | 1 53.2 |
| 16 | 17 37 32.96 | 13.532 | 24 47 45.6 | 12.43 | 1 54.7 |
| 17 | 17 42 57.87 | .544 | 24 52 21.9 | 10.58 | 1 56.3 |
| 18 | 17 48 23.08 | .555 | 24 56 13.7 | 8.72 | 1 57.8 |
| 19 | 17 53 48.52 | .563 | 24 59 20.8 | 6.86 | 1 59.3 |
| 20 | 17 59 14.12 | .569 | 25 1 42.9 | 4.98 | 2 0.7 |
| 21 | 18 4 39.81 | 13.569 | 25 3 20.1 | 3.11 | 2 2.1 |
| 22 | 18 10 5.58 | .571 | 25 4 12.1 | −1.22 | 2 3.6 |
| 23 | 18 15 31.21 | .567 | 25 4 18.7 | +0.66 | 2 5.1 |
| 24 | 18 20 56.77 | .561 | 25 3 40.1 | 2.55 | 2 6.6 |
| 25 | 18 26 22.15 | .552 | 25 2 16.4 | 4.43 | 2 8.1 |
| 26 | 18 31 47.28 | 13.540 | 25 0 7.5 | 6.31 | 2 9.5 |
| 27 | 18 37 12.08 | .525 | 24 57 13.6 | 8.18 | 2 11.0 |
| 28 | 18 42 36.48 | .506 | 24 53 34.6 | 10.06 | 2 12.5 |
| 29 | 18 48 0.40 | .485 | 24 49 10.7 | 11.93 | 2 13.9 |
| 30 | 18 53 23.79 | .462 | 24 44 2.2 | 13.77 | 2 15.4 |
| 31 | 18 58 46.58 | 13.435 | 24 38 9.5 | 15.60 | 2 16.9 |
| 32 | 19 4 8.67 | 13.404 | −24 31 32.6 | 17.45 | 2 18.4 |

| Day of the Month, | 1st. | 6th. | 11th. | 16th. | 21st. | 26th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.9 | 6.0 | 6.1 | 6.2 | 6.3 | 6.4 |
| Hor. Parallax | 5.9 | 6.0 | 6.1 | 6.2 | 6.3 | 6.5 |

## DECEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 18 58 46.58 | 13.435 | −24 38 9.5 | 15.60 | 2 16.9 |
| 2 | 19 4 8.67 | .404 | 24 31 32.6 | 17.45 | 2 18.4 |
| 3 | 19 9 30.01 | .372 | 24 24 12.0 | 19.27 | 2 19.8 |
| 4 | 19 14 50.53 | .337 | 24 16 7.8 | 21.06 | 2 21.1 |
| 5 | 19 20 10.18 | .299 | 24 7 20.5 | 22.86 | 2 22.4 |
| 6 | 19 25 28.90 | 13.258 | 23 57 50.6 | 24.62 | 2 23.8 |
| 7 | 19 30 46.63 | .217 | 23 47 38.5 | 26.37 | 2 25.1 |
| 8 | 19 36 3.31 | .172 | 23 36 44.5 | 28.11 | 2 26.5 |
| 9 | 19 41 18.89 | .125 | 23 25 9.3 | 29.82 | 2 27.8 |
| 10 | 19 46 33.31 | .076 | 23 12 53.2 | 31.51 | 2 29.1 |
| 11 | 19 51 46.55 | 13.026 | 22 59 56.9 | 33.17 | 2 30.3 |
| 12 | 19 56 58.55 | 12.973 | 22 46 20.9 | 34.81 | 2 31.6 |
| 13 | 20 2 9.28 | .920 | 22 32 5.8 | 36.43 | 2 32.8 |
| 14 | 20 7 18.70 | .864 | 22 17 12.2 | 38.02 | 2 34.1 |
| 15 | 20 12 26.79 | .808 | 22 1 40.7 | 39.58 | 2 35.3 |
| 16 | 20 17 33.49 | 12.750 | 21 45 31.7 | 41.14 | 2 36.5 |
| 17 | 20 22 38.79 | .691 | 21 28 46.0 | 42.65 | 2 37.6 |
| 18 | 20 27 42.66 | .631 | 21 11 24.5 | 44.13 | 2 38.7 |
| 19 | 20 32 45.09 | .570 | 20 53 27.8 | 45.59 | 2 39.8 |
| 20 | 20 37 46.05 | .508 | 20 34 56.3 | 47.02 | 2 40.9 |
| 21 | 20 42 45.53 | 12.447 | 20 15 50.9 | 48.42 | 2 41.9 |
| 22 | 20 47 43.50 | .383 | 19 56 12.2 | 49.79 | 2 42.9 |
| 23 | 20 52 39.96 | .320 | 19 36 1.1 | 51.12 | 2 43.9 |
| 24 | 20 57 34.88 | .256 | 19 15 18.1 | 52.44 | 2 44.9 |
| 25 | 21 2 28.27 | .192 | 18 54 4.1 | 53.71 | 2 45.9 |
| 26 | 21 7 20.10 | 12.127 | 18 32 20.0 | 54.95 | 2 46.8 |
| 27 | 21 12 10.38 | 12.062 | 18 10 6.5 | 56.16 | 2 47.6 |
| 28 | 21 16 59.10 | 11.997 | 17 47 24.2 | 57.34 | 2 48.5 |
| 29 | 21 21 46.25 | .932 | 17 24 18.9 | 58.49 | 2 49.3 |
| 30 | 21 26 31.85 | .867 | 17 0 36.6 | 59.59 | 2 50.2 |
| 31 | 21 31 15.88 | 11.802 | 16 36 33.2 | 60.67 | 2 51.0 |
| 32 | 21 35 58.34 | .737 | −16 12 4.4 | 66.73 | 2 51.9 |

| Day of Month, | 1st. | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiam. | 6.6 | 6.7 | 6.9 | 7.0 | 7.2 | 7.4 | 7.6 |
| Hor. Par. | 6.6 | 6.8 | 6.9 | 7.1 | 7.3 | 7.5 | 7.7 |

# MARS, 1856.

## JANUARY.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 12 34 16.99 | 3.913 | −1 12 54.2 | 23.10 | 17 51.2 |
| 2 | 12 35 50.59 | .877 | 1 22 4.7 | 22.79 | 17 48.9 |
| 3 | 12 37 23.12 | .839 | 1 31 7.3 | 22.48 | 17 46.4 |
| 4 | 12 38 54.81 | .800 | 1 40 2.3 | 22.17 | 17 44.0 |
| 5 | 12 40 25.55 | .760 | 1 48 50.3 | 21.86 | 17 41.5 |
| 6 | 12 41 55.31 | 3.719 | 1 57 31.1 | 21.55 | 17 39.0 |
| 7 | 12 43 24.07 | .677 | 2 6 4.5 | 21.24 | 17 36.5 |
| 8 | 12 44 51.79 | .633 | 2 14 30.6 | 20.93 | 17 34.0 |
| 9 | 12 46 18.45 | .588 | 2 22 49.3 | 20.61 | 17 31.5 |
| 10 | 12 47 44.01 | .542 | 2 31 0.0 | 20.27 | 17 29.0 |
| 11 | 12 49 8.46 | 3.495 | 2 39 2.4 | 19.92 | 17 26.5 |
| 12 | 12 50 31.78 | .447 | 2 46 56.4 | 19.57 | 17 23.9 |
| 13 | 12 51 53.92 | .398 | 2 54 41.7 | 19.21 | 17 21.3 |
| 14 | 12 53 14.86 | .347 | 3 2 18.2 | 18.85 | 17 18.7 |
| 15 | 12 54 34.58 | .296 | 3 9 46.0 | 18.48 | 17 16.1 |
| 16 | 12 55 53.07 | 3.243 | 3 17 5.0 | 18.10 | 17 13.5 |
| 17 | 12 57 10.28 | .190 | 3 24 14.8 | 17.72 | 17 10.8 |
| 18 | 12 58 26.20 | .136 | 3 31 15.4 | 17.34 | 17 8.1 |
| 19 | 12 59 40.82 | .082 | 3 38 6.6 | 16.95 | 17 5.4 |
| 20 | 13 0 54.11 | 3.025 | 3 44 48.4 | 16.56 | 17 2.7 |
| 21 | 13 2 6.01 | 2.966 | 3 51 21.0 | 16.16 | 16 59.9 |
| 22 | 13 3 16.50 | .907 | 3 57 44.2 | 15.76 | 16 57.1 |
| 23 | 13 4 25.56 | .848 | 4 3 57.6 | 15.35 | 16 54.3 |
| 24 | 13 5 33.17 | .787 | 4 10 1.1 | 14.94 | 16 51.5 |
| 25 | 13 6 39.30 | .724 | 4 15 54.6 | 14.52 | 16 48.7 |
| 26 | 13 7 43.91 | 2.660 | 4 21 37.9 | 14.09 | 16 45.8 |
| 27 | 13 8 46.97 | .594 | 4 27 10.8 | 13.65 | 16 42.9 |
| 28 | 13 9 48.43 | .525 | 4 32 33.3 | 13.20 | 16 40.0 |
| 29 | 13 10 48.21 | .454 | 4 37 44.7 | 12.74 | 16 37.0 |
| 30 | 13 11 46.25 | .382 | 4 42 45.0 | 12.27 | 16 34.0 |
| 31 | 13 12 42.53 | 2.308 | 4 47 34.0 | 11.80 | 16 31.0 |
| 32 | 13 13 37.01 | 2.233 | −4 52 11.7 | 11.32 | 16 27.9 |

| Day of Month, | 1st. | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiam. | 3.8 | 4.0 | 4.2 | 4.4 | 4.6 | 4.8 | 5.0 |
| Hor. Par. | 6.5 | 6.8 | 7.1 | 7.4 | 7.7 | 8.1 | 8.5 |

## FEBRUARY.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 13 13 37.01 | 2.233 | −4 52 11.7 | 11.32 | 16 27.9 |
| 2 | 13 14 29.65 | .154 | 4 56 37.6 | 10.83 | 16 24.8 |
| 3 | 13 15 20.38 | 2.073 | 5 0 51.4 | 10.33 | 16 21.7 |
| 4 | 13 16 9.12 | 1.991 | 5 4 53.1 | 9.82 | 16 18.6 |
| 5 | 13 16 55.88 | .907 | 5 8 42.7 | 9.30 | 16 15.4 |
| 6 | 13 17 40.64 | 1.822 | 5 12 19.8 | 8.78 | 16 12.2 |
| 7 | 13 18 23.35 | .735 | 5 15 44.4 | 8.25 | 16 8.9 |
| 8 | 13 19 3.96 | .648 | 5 18 56.3 | 7.72 | 16 5.6 |
| 9 | 13 19 42.43 | .558 | 5 21 55.3 | 7.19 | 16 2.3 |
| 10 | 13 20 18.72 | .466 | 5 24 41.5 | 6.65 | 15 59.0 |
| 11 | 13 20 52.81 | 1.373 | 5 27 14.7 | 6.11 | 15 55.6 |
| 12 | 13 21 24.64 | .278 | 5 29 34.9 | 5.56 | 15 52.2 |
| 13 | 13 21 54.18 | .182 | 5 31 41.8 | 5.01 | 15 48.7 |
| 14 | 13 22 21.38 | 1.088 | 5 33 35.8 | 4.45 | 15 45.2 |
| 15 | 13 22 46.21 | 0.964 | 5 35 15.2 | 3.88 | 15 41.6 |
| 16 | 13 23 8.64 | 0.883 | 5 36 41.4 | 3.31 | 15 38.0 |
| 17 | 13 23 28.62 | .780 | 5 37 53.8 | 2.73 | 15 34.4 |
| 18 | 13 23 46.09 | .675 | 5 38 52.2 | 2.14 | 15 30.8 |
| 19 | 13 24 1.00 | .568 | 5 39 36.4 | 1.55 | 15 27.1 |
| 20 | 13 24 13.35 | .459 | 5 40 6.4 | 0.95 | 15 23.3 |
| 21 | 13 24 23.10 | 0.349 | 5 40 22.1 | −0.34 | 15 19.5 |
| 22 | 13 24 30.16 | .237 | 5 40 22.8 | +0.28 | 15 15.7 |
| 23 | 13 24 34.51 | .123 | 5 40 8.5 | 0.90 | 15 11.8 |
| 24 | 13 24 36.10 | +.008 | 5 39 39.4 | 1.53 | 15 7.9 |
| 25 | 13 24 34.89 | −.108 | 5 38 55.2 | 2.16 | 15 3.9 |
| 26 | 13 24 30.89 | 0.225 | 5 37 55.8 | 2.79 | 14 59.9 |
| 27 | 13 24 24.07 | .344 | 5 36 41.1 | 3.43 | 14 55.8 |
| 28 | 13 24 14.35 | .466 | 5 35 11.1 | 4.07 | 14 51.7 |
| 29 | 13 24 1.70 | .588 | 5 33 25.7 | 4.71 | 14 47.5 |
| 30 | 13 23 46.12 | .710 | 5 31 25.0 | 5.35 | 14 43.3 |
| 31 | 13 23 27.59 | 0.834 | 5 29 9.0 | 5.99 | 14 39.0 |
| 32 | 13 23 6.09 | 0.958 | −5 26 37.7 | 6.63 | 14 34.7 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. |
|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.2 | 5.5 | 5.8 | 6.0 | 6.3 |
| Hor. Parallax | 8.9 | 9.4 | 9.9 | 10.4 | 10.8 |

## MARCH.

| Day of the Month. | GREENWICH MEAN TIME. Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 13 23 46.12 | 0.710 | −5 31 25.0 | 5.35 | 14 43.3 |
| 2 | 13 23 27.59 | .834 | 5 29 9.0 | 5.99 | 14 39.0 |
| 3 | 13 23 6.09 | 0.958 | 5 26 37.7 | 6.63 | 14 34.7 |
| 4 | 13 22 41.62 | 1.082 | 5 23 51.2 | 7.27 | 14 30.3 |
| 5 | 13 22 14.18 | .206 | 5 20 49.2 | 7.91 | 14 25.9 |
| 6 | 13 21 43.76 | 1.330 | 5 17 31.9 | 8.54 | 14 21.5 |
| 7 | 13 21 10.36 | .454 | 5 13 59.5 | 9.16 | 14 17.0 |
| 8 | 13 20 33.99 | .576 | 5 10 12.2 | 9.77 | 14 12.4 |
| 9 | 13 19 54.70 | .697 | 5 6 10.1 | 10.37 | 14 7.8 |
| 10 | 13 19 12.54 | .817 | 5 1 53.6 | 10.97 | 14 3.1 |
| 11 | 13 18 27.52 | 1.935 | 4 57 23.0 | 11.56 | 13 58.4 |
| 12 | 13 17 39.69 | 2.052 | 4 52 38.7 | 12.13 | 13 53.6 |
| 13 | 13 16 49.06 | .167 | 4 47 41.1 | 12.68 | 13 48.8 |
| 14 | 13 15 55.70 | .260 | 4 42 30.3 | 13.21 | 13 44.0 |
| 15 | 13 14 59.65 | .390 | 4 37 6.9 | 13.73 | 13 39.1 |
| 16 | 13 14 1.00 | 2.497 | 4 31 31.3 | 14.23 | 13 34.2 |
| 17 | 13 12 59.79 | .602 | 4 25 43.8 | 14.71 | 13 29.2 |
| 18 | 13 11 56.11 | .704 | 4 19 45.0 | 15.17 | 13 24.2 |
| 19 | 13 10 50.05 | .801 | 4 13 35.2 | 15.61 | 13 19.2 |
| 20 | 13 9 41.70 | .893 | 4 7 15.0 | 16.03 | 13 14.1 |
| 21 | 13 8 31.18 | 2.981 | 4 0 45.1 | 16.43 | 13 9.0 |
| 22 | 13 7 18.58 | 3.067 | 3 54 6.2 | 16.80 | 13 3.8 |
| 23 | 13 6 3.95 | .149 | 3 47 19.1 | 17.14 | 12 58.6 |
| 24 | 13 4 47.45 | .226 | 3 40 24.6 | 17.45 | 12 53.4 |
| 25 | 13 3 29.15 | .298 | 3 33 22.9 | 17.72 | 12 48.2 |
| 26 | 13 2 9.17 | 3.364 | 3 26 14.9 | 17.94 | 12 42.9 |
| 27 | 13 0 47.68 | .424 | 3 19 2.0 | 18.13 | 12 37.6 |
| 28 | 12 59 24.81 | .479 | 3 11 44.9 | 18.29 | 12 32.3 |
| 29 | 12 58 0.69 | .528 | 3 4 24.0 | 18.43 | 12 27.0 |
| 30 | 12 56 35.47 | .570 | 2 57 0.3 | 18.53 | 12 21.6 |
| 31 | 12 55 9.34 | 3.604 | 2 49 34.8 | 18.58 | 12 16.2 |
| 32 | 12 53 42.46 | 3.632 | −2 42 8.5 | 18.59 | 12 10.9 |

## APRIL.

| Day of the Month. | GREENWICH MEAN TIME. Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 12 53 42.46 | 3.632 | −2 42 8.5 | 18.59 | 12 10.9 |
| 2 | 12 52 14.99 | .653 | 2 34 42.5 | 18.56 | 12 5.5 |
| 3 | 12 50 47.11 | .667 | 2 27 17.6 | 18.50 | 12 0.1 |
| 4 | 12 49 18.99 | .674 | 2 19 54.6 | 18.40 | 11 54.7 |
| 5 | 12 47 50.80 | .672 | 2 12 34.3 | 18.25 | 11 49.3 |
| 6 | 12 46 22.72 | 3.665 | 2 5 18.4 | 18.04 | 11 43.9 |
| 7 | 12 44 54.90 | .649 | 1 58 8.2 | 17.78 | 11 38.5 |
| 8 | 12 43 27.56 | .625 | 1 51 4.8 | 17.49 | 11 33.1 |
| 9 | 12 42 0.87 | .595 | 1 44 8.6 | 17.18 | 11 27.7 |
| 10 | 12 40 34.97 | .560 | 1 37 20.3 | 16.83 | 11 22.4 |
| 11 | 12 39 10.01 | 3.517 | 1 30 40.8 | 16.44 | 11 17.1 |
| 12 | 12 37 46.15 | .468 | 1 24 11.3 | 16.00 | 11 11.8 |
| 13 | 12 36 23.53 | .412 | 1 17 52.6 | 15.54 | 11 6.5 |
| 14 | 12 35 2.38 | .348 | 1 11 45.5 | 15.03 | 11 1.2 |
| 15 | 12 33 42.80 | .281 | 1 5 51.0 | 14.49 | 10 56.0 |
| 16 | 12 32 24.90 | 3.208 | 1 0 9.8 | 13.93 | 10 50.8 |
| 17 | 12 31 8.78 | .132 | 0 54 42.3 | 13.35 | 10 45.6 |
| 18 | 12 29 54.55 | 3.051 | 0 49 28.6 | 12.76 | 10 40.5 |
| 19 | 12 28 42.32 | 2.965 | 0 44 29.1 | 12.15 | 10 35.4 |
| 20 | 12 27 32.21 | .875 | 0 39 44.6 | 11.52 | 10 30.3 |
| 21 | 12 26 24.31 | 2.781 | 0 35 15.6 | 10.87 | 10 25.3 |
| 22 | 12 25 18.74 | .682 | 0 31 3.1 | 10.20 | 10 20.3 |
| 23 | 12 24 15.61 | .579 | 0 27 7.1 | 9.51 | 10 15.3 |
| 24 | 12 23 14.99 | .472 | 0 23 28.0 | 8.80 | 10 10.4 |
| 25 | 12 22 16.93 | .365 | 0 20 5.9 | 8.08 | 10 5.5 |
| 26 | 12 21 21.47 | 2.255 | 0 17 1.0 | 7.34 | 10 0.6 |
| 27 | 12 20 28.66 | .143 | 0 14 13.6 | 6.60 | 9 55.8 |
| 28 | 12 19 38.58 | 2.028 | 0 11 43.9 | 5.85 | 9 51.1 |
| 29 | 12 18 51.29 | 1.911 | 0 9 32.0 | 5.10 | 9 46.4 |
| 30 | 12 18 6.84 | .792 | 0 7 38.2 | 4.35 | 9 41.8 |
| 31 | 12 17 25.27 | 1.672 | 0 6 2.8 | 3.59 | 9 37.2 |
| 32 | 12 16 46.59 | 1.551 | −0 4 46.0 | 2.82 | 9 32.6 |

| Day of Month, 1st. | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|
| Semidiam. ″ 6.6 | ″ 6.9 | ″ 7.2 | ″ 7.4 | ″ 7.7 | ″ 7.9 | ″ 8.0 |
| Hor. Par. 11.3 | 11.8 | 12.3 | 12.7 | 13.1 | 13.4 | 13.7 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. | 30th. |
|---|---|---|---|---|---|---|
| Semidiameter | ″ 8.1 | ′ 8.1 | ′ 8.0 | ″ 7.9 | ″ 7.7 | ″ 7.5 |
| Hor. Parallax | 13.8 | 13.7 | 13.6 | 13.4 | 13.1 | 12.8 |

## MAY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 12 17 25.27 | 1.672 | −0 6 2.8 | 3.59 | 9 37.2 |
| 2 | 12 16 46.59 | .551 | 0 4 46.0 | 2.82 | 9 32.6 |
| 3 | 12 16 10.83 | .429 | 0 3 47.8 | 2.04 | 9 28.1 |
| 4 | 12 15 38.01 | .306 | 0 3 8.8 | 1.27 | 9 23.7 |
| 5 | 12 15 8.14 | .182 | 0 2 47.4 | +0.50 | 9 19.3 |
| 6 | 12 14 41.23 | 1.058 | 0 2 44.7 | −0.27 | 9 15.0 |
| 7 | 12 14 17.32 | 0.933 | 0 3 0.2 | 1.04 | 9 10.7 |
| 8 | 12 13 56.45 | .807 | 0 3 34.1 | 1.80 | 9 6.4 |
| 9 | 12 13 38.61 | .682 | 0 4 26.4 | 2.55 | 9 2.1 |
| 10 | 12 13 23.74 | .559 | 0 5 36.8 | 3.30 | 8 57.9 |
| 11 | 12 13 11.81 | 0.436 | 0 7 5.0 | 4.04 | 8 53.7 |
| 12 | 12 13 2.82 | .314 | 0 8 50.8 | 4.77 | 8 49.6 |
| 13 | 12 12 56.75 | .193 | 0 10 54.1 | 5.49 | 8 45.6 |
| 14 | 12 12 53.55 | −.074 | 0 13 14.4 | 6.20 | 8 41.7 |
| 15 | 12 12 53.18 | +.044 | 0 15 51.6 | 6.90 | 8 37.8 |
| 16 | 12 12 55.63 | 0.160 | 0 18 45.4 | 7.58 | 8 34.0 |
| 17 | 12 13 0.85 | .275 | 0 21 55.6 | 8.25 | 8 30.2 |
| 18 | 12 13 8.81 | .388 | 0 25 21.8 | 8.91 | 8 26.4 |
| 19 | 12 13 19.47 | .499 | 0 29 3.9 | 9.56 | 8 22.6 |
| 20 | 12 13 32.78 | .609 | 0 33 1.3 | 10.20 | 8 18.9 |
| 21 | 12 13 48.71 | 0.718 | 0 37 14.0 | 10.84 | 8 15.8 |
| 22 | 12 14 7.24 | .826 | 0 41 41.6 | 11.46 | 8 11.7 |
| 23 | 12 14 28.32 | 0.931 | 0 46 24.0 | 12.07 | 8 8.1 |
| 24 | 12 14 51.91 | 1.035 | 0 51 20.8 | 12.67 | 8 4.6 |
| 25 | 12 15 17.98 | .137 | 0 56 31.8 | 13.26 | 8 1.1 |
| 26 | 12 15 46.47 | 1.237 | 1 1 56.8 | 13.83 | 7 57.7 |
| 27 | 12 16 17.35 | .336 | 1 7 35.5 | 14.40 | 7 54.3 |
| 28 | 12 16 50.61 | .434 | 1 13 27.8 | 14.96 | 7 50.9 |
| 29 | 12 17 26.21 | .531 | 1 19 33.4 | 15.51 | 7 47.6 |
| 30 | 12 18 4.10 | .626 | 1 25 52.0 | 16.05 | 7 44.3 |
| 31 | 12 18 44.24 | 1.719 | 1 32 23.5 | 16.56 | 7 41.1 |
| 32 | 12 19 26.68 | 1.813 | −1 39 7.5 | 17.10 | 7 37.9 |

## JUNE.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 12 19 26.68 | 1.813 | −1 39 7.5 | 17.10 | 7 37.9 |
| 2 | 12 20 11.25 | .905 | 1 46 3.9 | 17.61 | 7 34.7 |
| 3 | 12 20 58.05 | 1.994 | 1 53 12.5 | 18.11 | 7 31.5 |
| 4 | 12 21 46.98 | 2.082 | 2 0 33.0 | 18.60 | 7 28.4 |
| 5 | 12 22 37.99 | .169 | 2 8 5.1 | 19.08 | 7 25.3 |
| 6 | 12 23 31.05 | 2.253 | 2 15 48.8 | 19.55 | 7 22.3 |
| 7 | 12 24 26.12 | .335 | 2 23 43.5 | 20.01 | 7 19.3 |
| 8 | 12 25 23.17 | .416 | 2 31 49.0 | 20.46 | 7 16.3 |
| 9 | 12 26 22.15 | .497 | 2 40 5.2 | 20.90 | 7 13.3 |
| 10 | 12 27 23.03 | .576 | 2 48 31.7 | 21.32 | 7 10.4 |
| 11 | 12 28 25.76 | 2.652 | 2 57 8.4 | 21.73 | 7 7.5 |
| 12 | 12 29 30.31 | .726 | 3 5 55.1 | 22.13 | 7 4.7 |
| 13 | 12 30 36.62 | .799 | 3 14 51.1 | 22.52 | 7 1.9 |
| 14 | 12 31 44.67 | .872 | 3 23 56.2 | 22.90 | 6 59.1 |
| 15 | 12 32 54.46 | 2.943 | 3 33 10.3 | 23.27 | 6 56.3 |
| 16 | 12 34 5.93 | 3.012 | 3 42 33.3 | 23.63 | 6 53.6 |
| 17 | 12 35 19.05 | .080 | 3 52 4.7 | 23.98 | 6 50.9 |
| 18 | 12 36 33.78 | .147 | 4 1 44.4 | 24.32 | 6 48.2 |
| 19 | 12 37 50.11 | .213 | 4 11 32.2 | 24.66 | 6 45.5 |
| 20 | 12 39 8.00 | .277 | 4 21 28.0 | 24.99 | 6 42.9 |
| 21 | 12 40 27.41 | 3.340 | 4 31 31.5 | 25.30 | 6 40.5 |
| 22 | 12 41 48.32 | .402 | 4 41 42.5 | 25.61 | 6 37.7 |
| 23 | 12 43 10.73 | .464 | 4 52 0.6 | 25.91 | 6 35.1 |
| 24 | 12 44 34.60 | .525 | 5 2 25.8 | 26.20 | 6 32.6 |
| 25 | 12 45 59.93 | .585 | 5 12 58.0 | 26.48 | 6 30.1 |
| 26 | 12 47 26.69 | 3.644 | 5 23 37.0 | 26.76 | 6 27.6 |
| 27 | 12 48 54.86 | .703 | 5 34 22.6 | 27.03 | 6 25.1 |
| 28 | 12 50 24.44 | .762 | 5 45 14.7 | 27.29 | 6 22.7 |
| 29 | 12 51 55.41 | .819 | 5 56 12.9 | 27.55 | 6 20.3 |
| 30 | 12 53 27.73 | .875 | 6 7 17.1 | 27.80 | 6 17.9 |
| 31 | 12 55 1.38 | 3.930 | 6 18 27.1 | 28.03 | 6 15.5 |
| 32 | 12 56 36.36 | 3.985 | −6 29 42.7 | 28.26 | 6 13.1 |

| Day of the Month, | 5th. | 10th. | 15th. | 20th. | 25th. | 30th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 7.2 | 7.0 | 6.8 | 6.5 | 6.3 | 6.1 |
| Hor. Parallax | 12.4 | 12.0 | 11.5 | 11.1 | 10.7 | 10.3 |

| Day of the Month, | 4th. | 9th. | 14th. | 19th. | 24th. | 29th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 |
| Hor. Parallax | 10.0 | 9.6 | 9.2 | 8.9 | 8.6 | 8.3 |

## JULY.

| Day of the Month. | GREENWICH MEAN TIME.<br>Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 12 55 1.38 | 3.930 | − 6 18 27.1 | 28.03 | 6 15.5 |
| 2 | 12 56 36.36 | 3.985 | 6 29 42.7 | 28.26 | 6 13.1 |
| 3 | 12 58 12.66 | 4.040 | 6 41 3.8 | 28.49 | 6 10.8 |
| 4 | 12 59 50.26 | .094 | 6 52 30.3 | 28.71 | 6 8.5 |
| 5 | 13 1 29.14 | .147 | 7 4 1.9 | 28.93 | 6 6.2 |
| 6 | 13 3 9.29 | 4.199 | 7 15 38.5 | 29.13 | 6 3.9 |
| 7 | 13 4 50.67 | .250 | 7 27 19.9 | 29.33 | 6 1.7 |
| 8 | 13 6 33.28 | .300 | 7 39 5.9 | 29.52 | 5 59.5 |
| 9 | 13 8 17.07 | .349 | 7 50 56.2 | 29.70 | 5 57.3 |
| 10 | 13 10 2.02 | .397 | 8 2 50.7 | 29.86 | 5 55.1 |
| 11 | 13 11 48.11 | 4.444 | 8 14 49.1 | 30.02 | 5 52.9 |
| 12 | 13 13 35.33 | .491 | 8 26 51.4 | 30.18 | 5 50.8 |
| 13 | 13 15 23.67 | .537 | 8 38 57.5 | 30.33 | 5 48.7 |
| 14 | 13 17 13.12 | .583 | 8 51 7.0 | 30.47 | 5 46.6 |
| 15 | 13 19 3.66 | .628 | 9 3 19.9 | 30.60 | 5 44.5 |
| 16 | 13 20 55.28 | 4.673 | 9 15 35.9 | 30.72 | 5 42.4 |
| 17 | 13 22 47.99 | .718 | 9 27 54.3 | 30.82 | 5 40.3 |
| 18 | 13 24 41.78 | .763 | 9 40 14.9 | 30.91 | 5 38.3 |
| 19 | 13 26 36.62 | .807 | 9 52 37.3 | 30.99 | 5 36.3 |
| 20 | 13 28 32.50 | .851 | 10 5 1.5 | 31.06 | 5 34.3 |
| 21 | 13 30 29.44 | 4.895 | 10 17 27.4 | 31.12 | 5 32.3 |
| 22 | 13 32 27.43 | .938 | 10 29 55.1 | 31.19 | 5 30.3 |
| 23 | 13 34 26.45 | 4.980 | 10 42 24.5 | 31.26 | 5 28.3 |
| 24 | 13 36 26.49 | 5.023 | 10 54 55.7 | 31.32 | 5 26.4 |
| 25 | 13 38 27.55 | .066 | 11 7 28.4 | 31.38 | 5 24.5 |
| 26 | 13 40 29.63 | 5.108 | 11 20 2.4 | 31.44 | 5 22.6 |
| 27 | 13 42 32.71 | .150 | 11 32 37.6 | 31.49 | 5 20.7 |
| 28 | 13 44 36.81 | .192 | 11 45 13.8 | 31.53 | 5 18.8 |
| 29 | 13 46 41.91 | .233 | 11 57 50.8 | 31.56 | 5 17.0 |
| 30 | 13 48 48.02 | .275 | 12 10 28.3 | 31.58 | 5 15.2 |
| 31 | 13 50 55.13 | 5.317 | 12 23 6.2 | 31.59 | 5 13.4 |
| 32 | 13 53 3.25 | 5.359 | −12 35 44.4 | 31.59 | 5 11.6 |

| Day of the Month, | 4th. | 9th. | 14th. | 19th. | 24th. | 29th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 |
| Hor. Parallax | 8.0 | 7.8 | 7.7 | 7.5 | 7.3 | 7.1 |

## AUGUST.

| Day of the Month. | GREENWICH MEAN TIME.<br>Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 13 53 3.25 | 5.359 | −12 35 44.4 | 31.59 | 5 11.6 |
| 2 | 13 55 12.37 | .401 | 12 48 22.7 | 31.58 | 5 9.8 |
| 3 | 13 57 22.49 | .443 | 13 1 0.7 | 31.57 | 5 8.0 |
| 4 | 13 59 33.61 | .484 | 13 13 38.3 | 31.55 | 5 6.3 |
| 5 | 14 1 45.71 | .525 | 13 26 15.2 | 31.52 | 5 4.5 |
| 6 | 14 3 58.79 | 5.566 | 13 38 51.2 | 31.48 | 5 2.8 |
| 7 | 14 6 12.84 | .606 | 13 51 26.2 | 31.43 | 5 1.1 |
| 8 | 14 8 27.86 | .646 | 14 3 59.7 | 31.37 | 4 59.4 |
| 9 | 14 10 43.83 | .685 | 14 16 31.6 | 31.30 | 4 57.7 |
| 10 | 14 13 0.74 | .724 | 14 29 1.8 | 31.21 | 4 56.0 |
| 11 | 14 15 18.58 | 5.762 | 14 41 29.9 | 31.12 | 4 54.4 |
| 12 | 14 17 37.34 | .801 | 14 53 55.7 | 31.03 | 4 52.8 |
| 13 | 14 19 57.03 | .840 | 15 6 19.2 | 30.94 | 4 51.2 |
| 14 | 14 22 17.65 | .878 | 15 18 40.5 | 30.84 | 4 49.6 |
| 15 | 14 24 39.19 | .917 | 15 30 59.6 | 30.75 | 4 48.0 |
| 16 | 14 27 1.64 | 5.955 | 15 43 16.3 | 30.67 | 4 46.4 |
| 17 | 14 29 25.01 | 5.993 | 15 55 31.9 | 30.58 | 4 44.9 |
| 18 | 14 31 49.30 | 6.031 | 16 7 44.8 | 30.48 | 4 43.4 |
| 19 | 14 34 14.51 | .070 | 16 19 55.2 | 30.35 | 4 41.9 |
| 20 | 14 36 40.64 | .108 | 16 32 1.9 | 30.19 | 4 40.4 |
| 21 | 14 39 7.69 | 6.146 | 16 44 4.3 | 30.01 | 4 38.9 |
| 22 | 14 41 35.66 | .184 | 16 56 2.5 | 29.83 | 4 37.4 |
| 23 | 14 44 4.54 | .222 | 17 7 56.4 | 29.65 | 4 36.0 |
| 24 | 14 46 34.34 | .261 | 17 19 45.7 | 29.45 | 4 34.6 |
| 25 | 14 49 5.07 | .300 | 17 31 30.3 | 29.25 | 4 33.1 |
| 26 | 14 51 36.72 | 6.338 | 17 43 9.6 | 29.05 | 4 31.7 |
| 27 | 14 54 9.29 | .376 | 17 54 43.7 | 28.84 | 4 30.3 |
| 28 | 14 56 42.77 | .414 | 18 6 13.0 | 28.62 | 4 28.9 |
| 29 | 14 59 17.17 | .452 | 18 17 37.3 | 28.40 | 4 27.5 |
| 30 | 15 1 52.48 | .490 | 18 28 56.2 | 28.17 | 4 26.1 |
| 31 | 15 4 28.71 | 6.527 | 18 40 9.6 | 27.94 | 4 24.8 |
| 32 | 15 7 5.83 | 6.565 | −18 51 17.3 | 27.70 | 4 23.5 |

| Day of the Month, | 3d. | 8th. | 13th. | 18th. | 23d. | 28th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 4.1 | 4.0 | 4.0 | 3.9 | 3.9 | 3.8 |
| Hor. Parallax | 7.0 | 6.9 | 6.7 | 6.6 | 6.5 | 6.4 |

## SEPTEMBER.

### GREENWICH MEAN TIME

| Day of the Month. | Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 15 7 5.83 | 6.565 | −18 51 17.3 | 27.70 | 4 23.5 |
| 2 | 15 9 43.84 | .602 | 19 2 19.2 | 27.45 | 4 22.2 |
| 3 | 15 12 22.75 | .640 | 19 13 15.2 | 27.19 | 4 20.9 |
| 4 | 15 15 2.54 | .677 | 19 24 5.0 | 26.93 | 4 19.6 |
| 5 | 15 17 43.23 | .714 | 19 34 47.8 | 26.65 | 4 18.3 |
| 6 | 15 20 24.82 | 6.751 | 19 45 23.3 | 26.35 | 4 17.1 |
| 7 | 15 23 7.28 | .788 | 19 55 51.0 | 26.04 | 4 15.9 |
| 8 | 15 25 50.64 | .825 | 20 6 11.0 | 25.71 | 4 14.7 |
| 9 | 15 28 34.87 | .861 | 20 16 23.4 | 25.37 | 4 13.5 |
| 10 | 15 31 19.98 | .898 | 20 26 28.2 | 25.03 | 4 12.3 |
| 11 | 15 34 5.97 | 6.934 | 20 36 24.8 | 24.69 | 4 11.1 |
| 12 | 15 36 52.84 | 6.970 | 20 46 13.3 | 24.35 | 4 10.0 |
| 13 | 15 39 40.55 | 7.006 | 20 55 53.5 | 24.01 | 4 8.9 |
| 14 | 15 42 29.11 | .042 | 21 5 25.5 | 23.66 | 4 7.8 |
| 15 | 15 45 18.52 | .077 | 21 14 49.1 | 23.30 | 4 6.7 |
| 16 | 15 48 8.78 | 7.111 | 21 24 4.0 | 22.93 | 4 5.6 |
| 17 | 15 50 59.85 | .145 | 21 33 9.5 | 22.54 | 4 4.5 |
| 18 | 15 53 51.75 | .179 | 21 42 5.5 | 22.14 | 4 3.4 |
| 19 | 15 56 44.47 | .213 | 21 50 52.0 | 21.73 | 4 2.3 |
| 20 | 15 59 38.01 | .247 | 21 59 28.8 | 21.31 | 4 1.2 |
| 21 | 16 2 32.35 | 7.280 | 22 7 55.3 | 20.88 | 4 0.2 |
| 22 | 16 5 27.50 | .313 | 22 16 11.3 | 20.45 | 3 59.2 |
| 23 | 16 8 23.44 | .347 | 22 24 16.9 | 20.01 | 3 58.2 |
| 24 | 16 11 20.16 | .380 | 22 32 11.9 | 19.56 | 3 57.2 |
| 25 | 16 14 17.69 | .412 | 22 39 55.9 | 19.10 | 3 56.2 |
| 26 | 16 17 16.01 | 7.445 | 22 47 28.8 | 18.63 | 3 55.2 |
| 27 | 16 20 15.10 | .477 | 22 54 50.2 | 18.16 | 3 54.3 |
| 28 | 16 23 14.96 | .510 | 23 2 0.0 | 17.68 | 3 53.3 |
| 29 | 16 26 15.58 | .542 | 23 8 58.5 | 17.20 | 3 52.4 |
| 30 | 16 29 16.95 | .573 | 23 15 45.6 | 16.72 | 3 51.5 |
| 31 | 16 32 19.05 | 7.603 | 23 22 21.2 | 16.24 | 3 50.6 |
| 32 | 16 35 21.88 | 7.633 | −23 28 45.1 | 15.74 | 3 49.7 |

| Day of the Month, | 2d. | 7th. | 12th. | 17th. | 22d. | 27th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 |
| Hor. Parallax | 6.3 | 6.2 | 6.2 | 6.1 | 6.0 | 5.9 |

## OCTOBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension.<br>Noon. | Var. of R.A. for 1 hour.<br>Noon. | Apparent Declination.<br>Noon. | Var. of Dec. for 1 hour.<br>Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 16 32 19.05 | 7.603 | −23 22 21.2 | 16.24 | 3 50.6 |
| 2 | 16 35 21.88 | .633 | 23 28 45.1 | 15.74 | 3 49.7 |
| 3 | 16 38 25.43 | .662 | 23 34 56.7 | 15.23 | 3 48.8 |
| 4 | 16 41 29.67 | .690 | 23 40 56.0 | 14.71 | 3 47.9 |
| 5 | 16 44 34.58 | .718 | 23 46 42.7 | 14.18 | 3 47.0 |
| 6 | 16 47 40.15 | 7.745 | 23 52 16.7 | 13.64 | 3 46.2 |
| 7 | 16 50 46.38 | .772 | 23 57 37.6 | 13.09 | 3 45.4 |
| 8 | 16 53 53.25 | .799 | 24 2 45.2 | 12.53 | 3 44.6 |
| 9 | 16 57 0.73 | .825 | 24 7 39.4 | 11.97 | 3 43.8 |
| 10 | 17 0 8.82 | .850 | 24 12 20.0 | 11.40 | 3 43.0 |
| 11 | 17 3 17.53 | 7.875 | 24 16 46.8 | 10.83 | 3 42.2 |
| 12 | 17 6 26.83 | .900 | 24 20 59.6 | 10.25 | 3 41.4 |
| 13 | 17 9 36.71 | .924 | 24 24 58.4 | 9.66 | 3 40.6 |
| 14 | 17 12 47.16 | .947 | 24 28 43.0 | 9.06 | 3 39.8 |
| 15 | 17 15 58.16 | .970 | 24 32 13.3 | 8.46 | 3 39.0 |
| 16 | 17 19 9.71 | 7.992 | 24 35 29.1 | 7.85 | 3 38.3 |
| 17 | 17 22 21.77 | 8.013 | 24 38 30.4 | 7.24 | 3 37.6 |
| 18 | 17 25 34.35 | .033 | 24 41 17.0 | 6.63 | 3 36.8 |
| 19 | 17 28 47.40 | .053 | 24 43 48.9 | 6.02 | 3 36.1 |
| 20 | 17 32 0.92 | .072 | 24 46 5.9 | 5.40 | 3 35.4 |
| 21 | 17 35 14.89 | 8.091 | 24 48 8.0 | 4.78 | 3 34.7 |
| 22 | 17 38 29.29 | .109 | 24 49 55.1 | 4.16 | 3 34.0 |
| 23 | 17 41 44.11 | .126 | 24 51 26.9 | 3.52 | 3 33.3 |
| 24 | 17 44 59.34 | .143 | 24 52 43.3 | 2.88 | 3 32.6 |
| 25 | 17 48 14.95 | .159 | 24 53 44.2 | 2.23 | 3 31.9 |
| 26 | 17 51 30.94 | 8.174 | 24 54 29.7 | 1.57 | 3 31.2 |
| 27 | 17 54 47.80 | .189 | 24 54 59.4 | 0.90 | 3 30.6 |
| 28 | 17 58 4.02 | .203 | 24 55 13.3 | −0.25 | 3 29.9 |
| 29 | 18 1 21.07 | .217 | 24 55 11.4 | +0.41 | 3 29.2 |
| 30 | 18 4 38.44 | .230 | 24 54 53.7 | 1.07 | 3 28.5 |
| 31 | 18 7 56.12 | 8.242 | 24 54 20.0 | 1.74 | 3 27.9 |
| 32 | 18 11 14.08 | 8.253 | −24 53 30.3 | 2.41 | 3 27.3 |

| Day of the Month, | 2d. | 7th. | 12th. | 17th. | 22d. | 27th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 3.4 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 |
| Hor. Parallax | 5.9 | 5.8 | 5.8 | 5.7 | 5.6 | 5.5 |

## NOVEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 18 11 14.08 | 8.253 | −24 53 30.3 | 2.41 | 3 27.3 |
| 2 | 18 14 32.28 | .263 | 24 52 24.6 | 3.08 | 3 26.6 |
| 3 | 18 17 50.72 | .272 | 24 51 2.9 | 3.75 | 3 25.9 |
| 4 | 18 21 9.35 | .280 | 24 49 25.0 | 4.42 | 3 25.3 |
| 5 | 18 24 28.16 | .287 | 24 47 31.0 | 5.09 | 3 24.7 |
| 6 | 18 27 47.13 | 8.293 | 24 45 20.9 | 5.76 | 3 24.1 |
| 7 | 18 31 6.24 | .298 | 24 42 54.6 | 6.44 | 3 23.4 |
| 8 | 18 34 25.46 | .302 | 24 40 12.2 | 7.12 | 3 22.8 |
| 9 | 18 37 44.76 | .306 | 24 37 13.4 | 7.80 | 3 22.2 |
| 10 | 18 41 4.14 | .309 | 24 33 58.4 | 8.47 | 3 21.6 |
| 11 | 18 44 23.58 | 8.311 | 24 30 27.1 | 9.15 | 3 21.0 |
| 12 | 18 47 43.05 | .312 | 24 26 39.6 | 9.83 | 3 20.4 |
| 13 | 18 51 2.55 | .313 | 24 22 35.9 | 10.50 | 3 19.8 |
| 14 | 18 54 22.06 | .313 | 24 18 16.0 | 11.17 | 3 19.2 |
| 15 | 18 57 41.57 | .313 | 24 13 39.9 | 11.84 | 3 18.6 |
| 16 | 19 1 1.06 | 8.312 | 24 8 47.9 | 12.51 | 3 18.0 |
| 17 | 19 4 20.51 | .310 | 24 3 39.8 | 13.18 | 3 17.4 |
| 18 | 19 7 39.92 | .308 | 23 58 15.7 | 13.84 | 3 16.8 |
| 19 | 19 10 59.27 | .305 | 23 52 35.6 | 14.50 | 3 16.2 |
| 20 | 19 14 18.53 | .301 | 23 46 39.7 | 15.16 | 3 15.6 |
| 21 | 19 17 37.69 | 8.297 | 23 40 27.9 | 15.82 | 3 14.9 |
| 22 | 19 20 56.75 | .292 | 23 34 0.4 | 16.48 | 3 14.3 |
| 23 | 19 24 15.69 | .286 | 23 27 17.1 | 17.14 | 3 13.7 |
| 24 | 19 27 34.48 | .280 | 23 20 18.1 | 17.79 | 3 13.1 |
| 25 | 19 30 53.10 | .273 | 23 13 3.3 | 18.44 | 3 12.4 |
| 26 | 19 34 11.56 | 8.266 | 23 5 33.0 | 19.09 | 3 11.7 |
| 27 | 19 37 29.83 | .258 | 22 57 47.1 | 19.74 | 3 11.1 |
| 28 | 19 40 47.89 | .249 | 22 49 45.5 | 20.39 | 3 10.5 |
| 29 | 19 44 5.73 | .239 | 22 41 28.5 | 21.03 | 3 9.9 |
| 30 | 19 47 23.35 | .229 | 22 32 56.0 | 21.67 | 3 9.2 |
| 31 | 19 50 40.73 | 8.218 | 22 24 8.4 | 22.30 | 3 8.5 |
| 32 | 19 53 57.83 | 8.206 | −22 15 5.8 | 22.92 | 3 7.9 |

| Day of the Month, | 1st. | 6th. | 11th. | 16th. | 21st. | 26th. |
|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiameter | 3.2 | 3.2 | 3.1 | 3.0 | 3.0 | 2.9 |
| Hor. Parallax | 5.4 | 5.4 | 5.3 | 5.2 | 5.1 | 5.0 |

## DECEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 19 50 40.73 | 8.218 | −22 24 8.4 | 22.30 | 3 8.5 |
| 2 | 19 53 57.83 | .206 | 22 15 5.8 | 22.92 | 3 7.9 |
| 3 | 19 57 14.63 | .194 | 22 5 48.4 | 23.54 | 3 7.2 |
| 4 | 20 0 31.13 | .181 | 21 56 16.3 | 24.15 | 3 6.5 |
| 5 | 20 3 47.33 | .168 | 21 46 29.5 | 24.75 | 3 5.8 |
| 6 | 20 7 3.21 | 8.154 | 21 36 28.6 | 25.34 | 3 5.1 |
| 7 | 20 10 18.75 | .140 | 21 26 13.6 | 25.92 | 3 4.5 |
| 8 | 20 13 33.96 | .126 | 21 15 44.6 | 26.50 | 3 3.8 |
| 9 | 20 16 48.83 | .111 | 21 5 1.7 | 27.07 | 3 3.1 |
| 10 | 20 20 3.33 | .096 | 20 54 5.2 | 27.63 | 3 2.4 |
| 11 | 20 23 17.45 | 8.080 | 20 42 55.3 | 28.19 | 3 1.7 |
| 12 | 20 26 31.19 | .064 | 20 31 32.1 | 28.74 | 3 1.0 |
| 13 | 20 29 44.55 | .048 | 20 19 55.8 | 29.29 | 3 0.3 |
| 14 | 20 32 57.51 | .032 | 20 8 6.3 | 29.83 | 2 59.6 |
| 15 | 20 36 10.08 | 8.015 | 19 56 3.9 | 30.37 | 2 58.8 |
| 16 | 20 39 22.25 | 7.998 | 19 43 48.7 | 30.90 | 2 58.0 |
| 17 | 20 42 34.01 | .981 | 19 31 20.9 | 31.43 | 2 57.3 |
| 18 | 20 45 45.35 | .964 | 19 18 40.5 | 31.95 | 2 56.6 |
| 19 | 20 48 56.29 | .947 | 19 5 47.7 | 32.46 | 2 55.8 |
| 20 | 20 52 6.80 | .929 | 18 52 42.8 | 32.96 | 2 55.0 |
| 21 | 20 55 16.90 | 7.911 | 18 39 25.8 | 33.46 | 2 54.2 |
| 22 | 20 58 26.57 | .894 | 18 25 57.0 | 33.95 | 2 53.4 |
| 23 | 21 1 35.82 | .876 | 18 12 16.5 | 34.43 | 2 52.6 |
| 24 | 21 4 44.64 | .858 | 17 58 24.6 | 34.90 | 2 51.8 |
| 25 | 21 7 53.03 | .840 | 17 44 21.5 | 35.36 | 2 51.0 |
| 26 | 21 11 0.98 | 7.822 | 17 30 7.4 | 35.81 | 2 50.2 |
| 27 | 21 14 8.50 | .804 | 17 15 42.7 | 36.25 | 2 49.4 |
| 28 | 21 17 15.59 | .786 | 17 1 7.2 | 36.68 | 2 48.6 |
| 29 | 21 20 22.26 | .768 | 16 46 21.3 | 37.11 | 2 47.8 |
| 30 | 21 23 28.49 | .750 | 16 31 25.5 | 37.53 | 2 47.0 |
| 31 | 21 26 34.29 | 7.732 | 16 16 19.9 | 37.93 | 2 46.1 |
| 32 | 21 29 39.64 | 7.713 | −16 1 4.9 | 38.32 | 2 45.3 |

| Day of Month, | 1st. | 6th. | 11th. | 16th. | 21st. | 26th. | 31st. |
|---|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | ″ | ″ | ″ |
| Semidiam. | 2.9 | 2.8 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 |
| Hor. Par. | 5.0 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 |

## JANUARY.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 22 13 5.41 | 1.855 | −12 8 33.9 | 10.57 | 3 31.4 |
| 2 | 22 13 50.10 | .869 | 12 4 19.2 | .67 | 3 28.2 |
| 3 | 22 14 35.13 | .883 | 12 0 2.1 | .77 | 3 25.0 |
| 4 | 22 15 20.48 | .896 | 11 55 42.7 | .86 | 3 21.8 |
| 5 | 22 16 6.15 | .909 | 11 51 21.1 | 10.95 | 3 18.7 |
| 6 | 22 16 52.13 | 1.922 | 11 46 57.3 | 11.04 | 3 15.5 |
| 7 | 22 17 38.42 | .935 | 11 42 31.3 | .13 | 3 12.3 |
| 8 | 22 18 25.01 | .948 | 11 38 3.2 | .22 | 3 9.1 |
| 9 | 22 19 11.90 | .960 | 11 33 32.9 | .30 | 3 6.0 |
| 10 | 22 19 59.08 | .972 | 11 29 0.6 | .39 | 3 2.8 |
| 11 | 22 20 46.53 | 1.983 | 11 24 26.2 | 11.48 | 2 59.6 |
| 12 | 22 21 34.25 | 1.994 | 11 19 49.8 | .56 | 2 56.5 |
| 13 | 22 22 22.24 | 2.005 | 11 15 11.5 | .64 | 2 53.4 |
| 14 | 22 23 10.49 | .015 | 11 10 31.2 | .72 | 2 50.2 |
| 15 | 22 23 58.99 | .025 | 11 5 49.0 | .80 | 2 47.1 |
| 16 | 22 24 47.73 | 2.035 | 11 1 5.0 | 11.88 | 2 44.0 |
| 17 | 22 25 36.70 | .045 | 10 56 19.2 | 11.95 | 2 40.9 |
| 18 | 22 26 25.90 | .055 | 10 51 31.6 | 12.03 | 2 37.8 |
| 19 | 22 27 15.33 | .064 | 10 46 42.3 | .10 | 2 34.7 |
| 20 | 22 28 4.98 | .073 | 10 41 51.2 | .17 | 2 31.6 |
| 21 | 22 28 54.84 | 2.082 | 10 36 58.3 | 12.24 | 2 28.5 |
| 22 | 22 29 44.91 | .091 | 10 32 3.7 | .31 | 2 25.4 |
| 23 | 22 30 35.18 | .099 | 10 27 7.5 | .38 | 2 22.3 |
| 24 | 22 31 25.65 | .107 | 10 22 9.7 | .45 | 2 19.2 |
| 25 | 22 32 16.31 | .115 | 10 17 10.3 | .51 | 2 16.1 |
| 26 | 22 33 7.16 | 2.123 | 10 12 9.3 | 12.57 | 2 13.0 |
| 27 | 22 33 58.19 | .130 | 10 7 6.9 | .63 | 2 9.9 |
| 28 | 22 34 49.39 | .137 | 10 2 3.0 | .69 | 2 6.8 |
| 29 | 22 35 40.76 | .144 | 9 56 57.6 | .75 | 2 3.8 |
| 30 | 22 36 32.29 | .151 | 9 51 50.7 | .81 | 2 0.7 |
| 31 | 22 37 23.98 | 2.158 | 9 46 42.4 | 12.87 | 1 57.6 |
| 32 | 22 38 15.83 | 2.164 | − 9 41 32.7 | 12.93 | 1 54.5 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 16.7 | 16.4 | 16.1 | 15.9 |
| Horizontal Parallax | 1.5 | 1.5 | 1.5 | 1.5 |

## FEBRUARY.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s | s. | ° ′ ″ | ″ | h. m. |
| 1 | 22 38 15.83 | 2.164 | −9 41 32.7 | 12.93 | 1 54.5 |
| 2 | 22 39 7.83 | .170 | 9 36 21.7 | 12.98 | 1 51.5 |
| 3 | 22 39 59.97 | .176 | 9 31 9.4 | 13.03 | 1 48.4 |
| 4 | 22 40 52.25 | .182 | 9 25 55.8 | .08 | 1 45.3 |
| 5 | 22 41 44.66 | .187 | 9 20 41.0 | .13 | 1 42.2 |
| 6 | 22 42 37.20 | 2.192 | 9 15 24.9 | 13.18 | 1 39.2 |
| 7 | 22 43 30.86 | .197 | 9 10 7.6 | .23 | 1 36.1 |
| 8 | 22 44 22.63 | .201 | 9 4 49.2 | .28 | 1 33.0 |
| 9 | 22 45 15.50 | .205 | 8 59 29.7 | .33 | 1 30.0 |
| 10 | 22 46 8.47 | .209 | 8 54 9.2 | .37 | 1 27.0 |
| 11 | 22 47 1.54 | 2.213 | 8 48 47.7 | 13.41 | 1 23.9 |
| 12 | 22 47 54.70 | .217 | 8 43 25.2 | .45 | 1 20.8 |
| 13 | 22 48 47.95 | .221 | 8 38 1.7 | .49 | 1 17.8 |
| 14 | 22 49 41.28 | .224 | 8 32 37.3 | .53 | 1 14.8 |
| 15 | 22 50 34.69 | .227 | 8 27 12.1 | .57 | 1 11.7 |
| 16 | 22 51 28.16 | 2.230 | 8 21 46.0 | 13.61 | 1 8.6 |
| 17 | 22 52 21.70 | .232 | 8 16 19.1 | .64 | 1 5.6 |
| 18 | 22 53 15.29 | .234 | 8 10 51.5 | .67 | 1 2.6 |
| 19 | 22 54 8.94 | .236 | 8 5 23.2 | .70 | 0 59.5 |
| 20 | 22 55 2.64 | .238 | 7 59 54.1 | .73 | 0 56.4 |
| 21 | 22 55 56.39 | 2.240 | 7 54 24.3 | 13.76 | 0 53.4 |
| 22 | 22 56 50.18 | .242 | 7 48 53.9 | .78 | 0 50.4 |
| 23 | 22 57 44.01 | .244 | 7 43 22.9 | .81 | 0 47.3 |
| 24 | 22 58 37.87 | .245 | 7 37 51.3 | .83 | 0 44.2 |
| 25 | 22 59 31.77 | .246 | 7 32 19.1 | .85 | 0 41.2 |
| 26 | 23 0 25.69 | 2.247 | 7 26 46.4 | 13.87 | 0 38.2 |
| 27 | 23 1 19.64 | .248 | 7 21 13.2 | .89 | 0 35.1 |
| 28 | 23 2 13.60 | .248 | 7 15 39.6 | .91 | 0 32.1 |
| 29 | 23 3 7.58 | .249 | 7 10 5.5 | .93 | 0 29.0 |
| 30 | 23 4 1.56 | .249 | 7 4 31.0 | .95 | 0 26.0 |
| 31 | 23 4 55.55 | 2.249 | 6 58 56.2 | 13.96 | 0 22.9 |
| 32 | 23 5 49.54 | 2.249 | −6 53 21.0 | 13.97 | 0 19.9 |

| Day of the Month, | 1st. | 11th. | 21st | 31st |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 15.9 | 15.7 | 15.6 | 15.6 |
| Horizontal Parallax | 1.5 | 1.4 | 1.4 | 1.4 |

## MARCH.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 23 4 1.56 | 2.249 | −7 4 31.0 | 13.95 | 0 26.0 |
| 2 | 23 4 55.55 | .249 | 6 58 56.2 | .96 | 0 22.9 |
| 3 | 23 5 49.54 | .249 | 6 53 21.0 | .97 | 0 19.9 |
| 4 | 23 6 43.53 | .249 | 6 47 45.5 | .98 | 0 16.9 |
| 5 | 23 7 37.50 | .249 | 6 42 9.8 | 13.99 | 0 13.9 |
| 6 | 23 8 31.46 | 2.248 | 6 36 33.9 | 14.00 | 0 10.8 |
| 7 | 23 9 25.40 | .247 | 6 30 57.8 | .00 | 0 7.8 |
| 8 | 23 10 19.31 | .246 | 6 25 21.6 | .01 | 0 4.8 |
| 9 | 23 11 13.19 | .245 | 6 19 45.3 | .01 | 0 1.8<br>23 58.7 |
| 10 | 23 12 7.04 | .243 | 6 14 8.9 | .01 | 23 55.7 |
| 11 | 23 13 0.85 | 2.241 | 6 8 32.5 | 14.01 | 23 52.7 |
| 12 | 23 13 54.61 | .239 | 6 2 56.2 | .01 | 23 49.6 |
| 13 | 23 14 48.32 | .237 | 5 57 20.0 | .01 | 23 46.6 |
| 14 | 23 15 41.97 | .235 | 5 51 43.9 | .00 | 23 43.5 |
| 15 | 23 16 35.57 | .232 | 5 46 7.9 | 14.00 | 23 40.5 |
| 16 | 23 17 29.11 | 2.229 | 5 40 32.0 | 13.99 | 23 37.4 |
| 17 | 23 18 22.58 | .226 | 5 34 56.3 | .98 | 23 34.4 |
| 18 | 23 19 15.98 | .223 | 5 29 20.9 | .97 | 23 31.3 |
| 19 | 23 20 9.31 | .220 | 5 23 45.7 | .96 | 23 28.3 |
| 20 | 23 21 2.56 | .217 | 5 18 10.8 | .95 | 23 25.2 |
| 21 | 23 21 55.72 | 2.213 | 5 12 36.3 | 13.93 | 23 22.2 |
| 22 | 23 22 48.80 | .210 | 5 7 2.1 | .92 | 23 19.1 |
| 23 | 23 23 41.79 | .206 | 5 1 28.3 | .90 | 23 16.1 |
| 24 | 23 24 34.69 | .202 | 4 55 54.9 | .88 | 23 13.0 |
| 25 | 23 25 27.50 | .198 | 4 50 22.0 | .86 | 23 10.0 |
| 26 | 23 26 20.21 | 2.194 | 4 44 49.7 | 13.84 | 23 6.9 |
| 27 | 23 27 12.81 | .190 | 4 39 17.9 | .82 | 23 3.9 |
| 28 | 23 28 5.30 | .185 | 4 33 46.6 | .80 | 23 0.8 |
| 29 | 23 28 57.68 | .180 | 4 28 15.8 | .77 | 22 57.8 |
| 30 | 23 29 49.95 | .175 | 4 22 45.6 | .74 | 22 54.7 |
| 31 | 23 30 42.10 | 2.170 | 4 17 16.1 | 13.71 | 22 51.7 |
| 32 | 23 31 34.13 | 2.165 | −4 11 47.4 | 13.68 | 22 48.6 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 15.6 | 15.6 | 15.6 | 15.7 |
| Horizontal Parallax | 1.4 | 1.4 | 1.4 | 1.5 |

## APRIL.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 23 31 34.13 | 2.165 | −4 11 47.4 | 13.68 | 22 48.6 |
| 2 | 23 32 26.03 | .159 | 4 6 19.4 | .65 | 22 45.5 |
| 3 | 23 33 17.78 | .153 | 4 0 52.2 | .62 | 22 42.5 |
| 4 | 23 34 9.40 | .147 | 3 55 25.8 | .59 | 22 39.4 |
| 5 | 23 35 0.87 | .141 | 3 50 0.3 | .55 | 22 36.3 |
| 6 | 23 35 52.19 | 2.135 | 3 44 35.7 | 13.51 | 22 33.2 |
| 7 | 23 36 43.36 | .129 | 3 39 12.0 | .47 | 22 30.1 |
| 8 | 23 37 34.37 | .122 | 3 33 49.3 | .43 | 22 27.0 |
| 9 | 23 38 25.21 | .115 | 3 28 27.6 | .39 | 22 23.9 |
| 10 | 23 39 15.88 | .108 | 3 23 7.0 | .34 | 22 20.8 |
| 11 | 23 40 6.38 | 2.101 | 3 17 47.5 | 13.29 | 22 17.7 |
| 12 | 23 40 56.70 | .093 | 3 12 29.1 | .24 | 22 14.6 |
| 13 | 23 41 46.84 | .085 | 3 7 11.9 | .19 | 22 11.5 |
| 14 | 23 42 36.79 | .077 | 3 1 55.9 | .13 | 22 8.4 |
| 15 | 23 43 26.55 | .069 | 2 56 41.2 | .08 | 22 5.3 |
| 16 | 23 44 16.12 | 2.061 | 2 51 27.7 | 13.08 | 22 2.2 |
| 17 | 23 45 5.49 | .053 | 2 46 15.5 | 12.98 | 21 59.1 |
| 18 | 23 45 54.66 | .044 | 2 41 4.7 | .92 | 21 55.9 |
| 19 | 23 46 43.62 | .036 | 2 35 55.2 | .86 | 21 52.8 |
| 20 | 23 47 32.37 | .027 | 2 30 47.1 | .80 | 21 49.7 |
| 21 | 23 48 20.91 | 2.018 | 2 25 40.4 | 12.74 | 21 46.6 |
| 22 | 23 49 9.24 | .009 | 2 20 35.2 | .68 | 21 43.4 |
| 23 | 23 49 57.35 | 2.000 | 2 15 31.5 | .62 | 21 40.3 |
| 24 | 23 50 45.23 | 1.991 | 2 10 29.3 | .56 | 21 37.1 |
| 25 | 23 51 32.88 | .981 | 2 5 28.6 | .50 | 21 34.0 |
| 26 | 23 52 20.30 | 1.971 | 2 0 29.5 | 12.43 | 21 30.8 |
| 27 | 23 53 7.48 | .961 | 1 55 32.1 | .36 | 21 27.7 |
| 28 | 23 53 54.41 | .951 | 1 50 36.4 | .29 | 21 24.5 |
| 29 | 23 54 41.09 | .940 | 1 45 42.4 | .22 | 21 21.4 |
| 30 | 23 55 27.52 | .929 | 1 40 50.2 | .14 | 21 18.2 |
| 31 | 23 56 13.69 | 1.918 | 1 35 59.8 | 12.07 | 21 15.1 |
| 32 | 23 56 59.59 | 1.907 | −1 31 11.2 | 11.99 | 21 11.9 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 15.7 | 15.9 | 16.1 | 16.4 |
| Horizontal Parallax | 1.5 | 1.5 | 1.5 | 1.5 |

# JUPITER, 1856.

## MAY.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 23 56 13.69 | 1.918 | −1 35 59.8 | 12.07 | 21 15.1 |
| 2 | 23 56 59.59 | .907 | 1 31 11.2 | 11.99 | 21 11.9 |
| 3 | 23 57 45.21 | .896 | 1 26 24.5 | .91 | 21 8.7 |
| 4 | 23 58 30.56 | .884 | 1 21 39.7 | .83 | 21 5.5 |
| 5 | 23 59 15.63 | .872 | 1 16 56.9 | .75 | 21 2.3 |
| 6 | 0 0 0.40 | 1.860 | 1 12 16.1 | 11.66 | 20 59.1 |
| 7 | 0 0 44.88 | .848 | 1 7 37.4 | .57 | 20 55.9 |
| 8 | 0 1 29.06 | .835 | 1 3 0.7 | .48 | 20 52.7 |
| 9 | 0 2 12.94 | .822 | 0 58 26.1 | .39 | 20 49.5 |
| 10 | 0 2 56.50 | .809 | 0 53 53.7 | .30 | 20 46.3 |
| 11 | 0 3 39.75 | 1.796 | 0 49 23.6 | 11.20 | 20 43.1 |
| 12 | 0 4 22.68 | .782 | 0 44 55.7 | .10 | 20 39.8 |
| 13 | 0 5 5.29 | .768 | 0 40 30.1 | 11.01 | 20 36.6 |
| 14 | 0 5 47.57 | .754 | 0 36 6.8 | 10.91 | 20 33.4 |
| 15 | 0 6 29.51 | .740 | 0 31 45.8 | .81 | 20 30.2 |
| 16 | 0 7 11.12 | 1.726 | 0 27 27.2 | 10.71 | 20 26.9 |
| 17 | 0 7 52.38 | .712 | 0 23 11.0 | .61 | 20 23.7 |
| 18 | 0 8 33.30 | .698 | 0 18 57.2 | .51 | 20 20.4 |
| 19 | 0 9 13.86 | .683 | 0 14 45.8 | .41 | 20 17.1 |
| 20 | 0 9 54.07 | .668 | 0 10 37.0 | .31 | 20 13.8 |
| 21 | 0 10 33.91 | 1.653 | 0 6 30.7 | 10.21 | 20 10.6 |
| 22 | 0 11 13.39 | .638 | −0 2 27.0 | 10.10 | 20 7.3 |
| 23 | 0 11 52.50 | .622 | +0 1 34.1 | 9.99 | 20 4.0 |
| 24 | 0 12 31.23 | .606 | 0 5 32.6 | .88 | 20 0.7 |
| 25 | 0 13 9.58 | .590 | 0 9 28.4 | .77 | 19 57.4 |
| 26 | 0 13 47.53 | 1.573 | 0 13 21.4 | 9.66 | 19 54.1 |
| 27 | 0 14 25.08 | .556 | 0 17 11.7 | .54 | 19 50.8 |
| 28 | 0 15 2.23 | .539 | 0 20 59.2 | .42 | 19 47.5 |
| 29 | 0 15 38.97 | .522 | 0 24 43.8 | .30 | 19 44.2 |
| 30 | 0 16 15.29 | .505 | 0 28 25.5 | .18 | 19 40.9 |
| 31 | 0 16 51.18 | 1.487 | 0 32 4.3 | 9.06 | 19 37.5 |
| 32 | 0 17 26.65 | 1.469 | +0 35 40.1 | 8.93 | 19 34.1 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 16.4 | 16.7 | 17.1 | 17.6 |
| Horizontal Parallax | 1.5 | 1.5 | 1.6 | 1.6 |

## JUNE.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 17 26.65 | 1.469 | +0 35 40.1 | 8.93 | 19 34.1 |
| 2 | 0 18 1.68 | .451 | 0 39 12.9 | .80 | 19 30.8 |
| 3 | 0 18 36.27 | .432 | 0 42 42.6 | .67 | 19 27.4 |
| 4 | 0 19 10.41 | .413 | 0 46 9.1 | .54 | 19 24.0 |
| 5 | 0 19 44.09 | .394 | 0 49 32.5 | .41 | 19 20.6 |
| 6 | 0 20 17.30 | 1.375 | 0 52 52.7 | 8.28 | 19 17.2 |
| 7 | 0 20 50.05 | .355 | 0 56 9.6 | .14 | 19 13.8 |
| 8 | 0 21 22.33 | .335 | 0 59 23.2 | 8.00 | 19 10.4 |
| 9 | 0 21 54.12 | .315 | 1 2 33.5 | 7.86 | 19 7.0 |
| 10 | 0 22 25.42 | .295 | 1 5 40.5 | .72 | 19 3.6 |
| 11 | 0 22 56.24 | 1.274 | 1 8 44.1 | 7.58 | 19 0.2 |
| 12 | 0 23 26.56 | .253 | 1 11 44.4 | .44 | 18 56.8 |
| 13 | 0 23 56.38 | .232 | 1 14 41.3 | .30 | 18 53.3 |
| 14 | 0 24 25.69 | .211 | 1 17 34.7 | .16 | 18 49.9 |
| 15 | 0 24 54.49 | .189 | 1 20 24.6 | 7.01 | 18 46.4 |
| 16 | 0 25 22.77 | 1.167 | 1 23 10.9 | 6.86 | 18 42.9 |
| 17 | 0 25 50.52 | .145 | 1 25 53.7 | .71 | 18 39.4 |
| 18 | 0 26 17.74 | .123 | 1 28 32.9 | .56 | 18 36.0 |
| 19 | 0 26 44.43 | .101 | 1 31 8.4 | .41 | 18 32.5 |
| 20 | 0 27 10.58 | .078 | 1 33 40.3 | .26 | 18 29.0 |
| 21 | 0 27 36.18 | 1.055 | 1 36 8.5 | 6.10 | 18 25.5 |
| 22 | 0 28 1.23 | .032 | 1 38 32.9 | 5.94 | 18 22.0 |
| 23 | 0 28 25.71 | 1.008 | 1 40 53.5 | .78 | 18 18.5 |
| 24 | 0 28 49.62 | 0.984 | 1 43 10.3 | .62 | 18 14.9 |
| 25 | 0 29 12.96 | .960 | 1 45 23.3 | .46 | 18 11.3 |
| 26 | 0 29 35.71 | 0.936 | 1 47 32.4 | 5.30 | 18 7.8 |
| 27 | 0 29 57.87 | .911 | 1 49 37.5 | 5.14 | 18 4.2 |
| 28 | 0 30 19.44 | .886 | 1 51 38.6 | 4.97 | 18 0.6 |
| 29 | 0 30 40.40 | .861 | 1 53 35.7 | .80 | 17 57.0 |
| 30 | 0 31 0.75 | .835 | 1 55 28.7 | .63 | 17 53.4 |
| 31 | 0 31 20.49 | 0.809 | 1 57 17.6 | 4.46 | 17 49.8 |
| 32 | 0 31 39.61 | 0.783 | +1 59 2.4 | 4.28 | 17 46.2 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 17.6 | 18.1 | 18.6 | 19.2 |
| Horizontal Parallax | 1.6 | 1.7 | 1.7 | 1.8 |

## JULY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 31 20.49 | 0.809 | +1 57 17.6 | 4.46 | 17 49.8 |
| 2 | 0 31 39.61 | .783 | 1 59 2.4 | .28 | 17 46.2 |
| 3 | 0 31 58.10 | .757 | 2 0 43.0 | 4.10 | 17 42.5 |
| 4 | 0 32 15.95 | .731 | 2 2 19.4 | 3.93 | 17 38.9 |
| 5 | 0 32 33.16 | .704 | 2 3 51.6 | .76 | 17 35.3 |
| 6 | 0 32 49.73 | 0.677 | 2 5 19.5 | 3.58 | 17 31.6 |
| 7 | 0 33 5.64 | .650 | 2 6 43.1 | .40 | 17 27.9 |
| 8 | 0 33 20.90 | .623 | 2 8 2.4 | .22 | 17 24.2 |
| 9 | 0 33 35.50 | .595 | 2 9 17.4 | 3.04 | 17 20.5 |
| 10 | 0 33 49.44 | .567 | 2 10 28.1 | 2.86 | 17 16.8 |
| 11 | 0 34 2.71 | 0.539 | 2 11 34.4 | 2.67 | 17 13.1 |
| 12 | 0 34 15.31 | .511 | 2 12 36.3 | .49 | 17 9.4 |
| 13 | 0 34 27.23 | .483 | 2 13 33.8 | .31 | 17 5.7 |
| 14 | 0 34 38.48 | .455 | 2 14 26.9 | 2.12 | 17 1.9 |
| 15 | 0 34 49.04 | .426 | 2 15 15.6 | 1.93 | 16 58.1 |
| 16 | 0 34 58.92 | 0.397 | 2 15 59.8 | 1.75 | 16 54.3 |
| 17 | 0 35 8.10 | .368 | 2 16 39.5 | .57 | 16 50.5 |
| 18 | 0 35 16.59 | .339 | 2 17 14.7 | .38 | 16 46.7 |
| 19 | 0 35 24.38 | .310 | 2 17 45.5 | .19 | 16 42.9 |
| 20 | 0 35 31.47 | .281 | 2 18 11.7 | 1.00 | 16 39.1 |
| 21 | 0 35 37.85 | 0.251 | 2 18 33.4 | 0.81 | 16 35.3 |
| 22 | 0 35 43.52 | .221 | 2 18 50.5 | .62 | 16 31.4 |
| 23 | 0 35 48.47 | .191 | 2 19 3.0 | .42 | 16 27.5 |
| 24 | 0 35 52.70 | .161 | 2 19 10.9 | .23 | 16 23.6 |
| 25 | 0 35 56.21 | .131 | 2 19 14.2 | +.04 | 16 19.7 |
| 26 | 0 35 59.00 | 0.101 | 2 19 12.9 | −.15 | 16 15.8 |
| 27 | 0 36 1.06 | .071 | 2 19 7.0 | .34 | 16 11.9 |
| 28 | 0 36 2.39 | .041 | 2 18 56.4 | .53 | 16 8.0 |
| 29 | 0 36 2.99 | +.010 | 2 18 41.1 | .72 | 16 4.1 |
| 30 | 0 36 2.85 | −.021 | 2 18 21.1 | 0.92 | 16 0.2 |
| 31 | 0 36 1.98 | 0.052 | 2 17 56.5 | 1.11 | 15 56.2 |
| 32 | 0 36 0.37 | 0.083 | +2 17 27.2 | 1.31 | 15 52.3 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 19.2 | 19.9 | 20.5 | 21.2 |
| Horizontal Parallax | 1.8 | 1.8 | 1.9 | 2.0 |

## AUGUST.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 36 0.37 | 0.083 | +2 17 27.2 | 1.31 | 15 52.3 |
| 2 | 0 35 58.08 | .114 | 2 16 53.3 | .51 | 15 48.3 |
| 3 | 0 35 54.96 | .144 | 2 16 14.8 | .70 | 15 44.3 |
| 4 | 0 35 51.16 | .174 | 2 15 31.7 | 1.89 | 15 40.3 |
| 5 | 0 35 46.63 | .205 | 2 14 44.0 | 2.08 | 15 36.3 |
| 6 | 0 35 41.37 | 0.235 | 2 13 51.7 | 2.27 | 15 32.3 |
| 7 | 0 35 35.39 | .265 | 2 12 54.9 | .46 | 15 28.3 |
| 8 | 0 35 28.68 | .295 | 2 11 53.6 | .65 | 15 24.2 |
| 9 | 0 35 21.26 | .325 | 2 10 47.8 | 2.84 | 15 20.2 |
| 10 | 0 35 13.12 | .355 | 2 9 37.6 | 3.02 | 15 16.1 |
| 11 | 0 35 4.28 | 0.384 | 2 8 23.0 | 3.20 | 15 12.0 |
| 12 | 0 34 54.73 | .413 | 2 7 4.0 | .38 | 15 7.9 |
| 13 | 0 34 44.48 | .442 | 2 5 40.7 | .56 | 15 3.8 |
| 14 | 0 34 33.54 | .471 | 2 4 13.1 | .74 | 14 59.7 |
| 15 | 0 34 21.91 | .500 | 2 2 41.2 | 3.92 | 14 55.6 |
| 16 | 0 34 9.59 | 0.528 | 2 1 5.1 | 4.09 | 14 51.4 |
| 17 | 0 33 56.59 | .556 | 1 59 24.9 | .26 | 14 47.3 |
| 18 | 0 33 42.91 | .584 | 1 57 40.6 | .43 | 14 43.1 |
| 19 | 0 33 28.57 | .612 | 1 55 52.2 | .60 | 14 38.9 |
| 20 | 0 33 13.57 | .639 | 1 53 59.8 | .77 | 14 34.7 |
| 21 | 0 32 57.91 | 0.666 | 1 52 3.5 | 4.93 | 14 30.5 |
| 22 | 0 32 41.61 | .693 | 1 50 3.2 | 5.09 | 14 26.3 |
| 23 | 0 32 24.67 | .719 | 1 47 59.0 | .25 | 14 22.1 |
| 24 | 0 32 7.10 | .745 | 1 45 51.0 | .41 | 14 17.8 |
| 25 | 0 31 48.91 | .771 | 1 43 39.3 | .56 | 14 13.6 |
| 26 | 0 31 30.12 | 0.796 | 1 41 24.0 | 5.71 | 14 9.4 |
| 27 | 0 31 10.73 | .820 | 1 39 5.1 | 5.86 | 14 5.1 |
| 28 | 0 30 50.75 | .844 | 1 36 42.7 | 6.00 | 14 0.8 |
| 29 | 0 30 30.20 | .868 | 1 34 16.9 | .14 | 13 56.5 |
| 30 | 0 30 9.09 | .891 | 1 31 47.8 | .28 | 13 52.2 |
| 31 | 0 29 47.44 | 0.913 | 1 29 15.5 | 6.41 | 13 47.9 |
| 32 | 0 29 25.26 | 0.935 | +1 26 40.1 | 6.54 | 13 43.6 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 21.2 | 21.8 | 22.4 | 22.9 |
| Horizontal Parallax | 2.0 | 2.0 | 2.1 | 2.1 |

## SEPTEMBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 29 25.26 | 0.935 | +1 26 40.1 | 6.54 | 13 43.6 |
| 2 | 0 29 2.56 | .956 | 1 24 1.7 | .66 | 13 39.3 |
| 3 | 0 28 39.37 | .976 | 1 21 20.4 | .78 | 13 35.0 |
| 4 | 0 28 15.70 | 0.996 | 1 18 36.4 | 6.89 | 13 30.7 |
| 5 | 0 27 51.56 | 1.015 | 1 15 49.8 | 7.00 | 13 26.3 |
| 6 | 0 27 26.97 | 1.033 | 1 13 0.7 | 7.10 | 13 22.0 |
| 7 | 0 27 1.95 | .051 | 1 10 9.2 | .20 | 13 17.6 |
| 8 | 0 26 36.52 | .068 | 1 7 15.4 | .29 | 13 13.2 |
| 9 | 0 26 10.70 | .084 | 1 4 19.4 | .38 | 13 8.8 |
| 10 | 0 25 44.50 | .099 | 1 1 21.3 | .46 | 13 4.5 |
| 11 | 0 25 17.94 | 1.114 | 0 58 21.3 | 7.54 | 13 0.1 |
| 12 | 0 24 51.05 | .127 | 0 55 19.6 | .61 | 12 55.7 |
| 13 | 0 24 23.84 | .140 | 0 52 16.3 | .67 | 12 51.3 |
| 14 | 0 23 56.33 | .152 | 0 49 11.5 | .73 | 12 46.9 |
| 15 | 0 23 28.54 | .163 | 0 46 5.3 | .78 | 12 42.5 |
| 16 | 0 23 0.49 | 1.173 | 0 42 57.8 | 7.83 | 12 38.1 |
| 17 | 0 22 32.19 | .183 | 0 39 49.1 | .88 | 12 33.7 |
| 18 | 0 22 3.67 | .192 | 0 36 39.4 | .92 | 12 29.3 |
| 19 | 0 21 34.95 | .200 | 0 33 28.8 | .96 | 12 24.9 |
| 20 | 0 21 6.05 | .207 | 0 30 17.5 | 7.99 | 12 20.5 |
| 21 | 0 20 36.98 | 1.214 | 0 27 5.6 | 8.01 | 12 16.1 |
| 22 | 0 20 7.77 | .219 | 0 23 53.2 | .02 | 12 11.7 |
| 23 | 0 19 38.45 | .223 | 0 20 40.6 | .03 | 12 7.3 |
| 24 | 0 19 9.04 | .226 | 0 17 27.9 | .03 | 12 2.9 |
| 25 | 0 18 39.55 | .229 | 0 14 15.1 | .03 | 11 58.5 |
| 26 | 0 18 10.02 | 1.230 | 0 11 2.5 | 8.02 | 11 54.1 |
| 27 | 0 17 40.46 | .231 | 0 7 50.2 | 8.00 | 11 49.7 |
| 28 | 0 17 10.90 | .231 | 0 4 38.3 | 7.98 | 11 45.3 |
| 29 | 0 16 41.36 | .230 | +0 1 27.0 | .95 | 11 40.8 |
| 30 | 0 16 11.86 | .228 | −0 1 48.5 | .91 | 11 36.4 |
| 31 | 0 15 42.43 | 1.225 | 0 4 53.0 | 7.87 | 11 32.0 |
| 32 | 0 15 13.10 | 1.221 | −0 8 1.4 | 7.82 | 11 27.6 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 22.9 | 23.4 | 23.5 | 23.5 |
| Horizontal Parallax | 2.1 | 2.2 | 2.2 | 2.2 |

## OCTOBER.

### GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 15 42.43 | 1.225 | −0 4 53.0 | 7.87 | 11 32.0 |
| 2 | 0 15 13.10 | .221 | 0 8 1.4 | .82 | 11 27.6 |
| 3 | 0 14 43.89 | .215 | 0 11 8.6 | .77 | 11 23.1 |
| 4 | 0 14 14.82 | .208 | 0 14 14.4 | .71 | 11 18.7 |
| 5 | 0 13 45.91 | .201 | 0 17 18.7 | .64 | 11 14.3 |
| 6 | 0 13 17.19 | 1.192 | 0 20 21.3 | 7.57 | 11 9.9 |
| 7 | 0 12 48.68 | .183 | 0 23 22.1 | .49 | 11 5.5 |
| 8 | 0 12 20.40 | .173 | 0 26 20.9 | .41 | 11 1.1 |
| 9 | 0 11 52.37 | .162 | 0 29 17.6 | .32 | 10 56.7 |
| 10 | 0 11 24.61 | .150 | 0 32 12.0 | .22 | 10 52.3 |
| 11 | 0 10 57.54 | 1.138 | 0 35 4.0 | 7.12 | 10 47.9 |
| 12 | 0 10 29.98 | .125 | 0 37 53.6 | 7.01 | 10 43.5 |
| 13 | 0 10 3.15 | .111 | 0 40 40.7 | 6.90 | 10 39.1 |
| 14 | 0 9 36.67 | .096 | 0 43 25.1 | .79 | 10 34.7 |
| 15 | 0 9 10.55 | .080 | 0 46 6.6 | .67 | 10 30.4 |
| 16 | 0 8 44.82 | 1.063 | 0 48 45.2 | 6.55 | 10 26.0 |
| 17 | 0 8 19.50 | .046 | 0 51 20.7 | .42 | 10 21.6 |
| 18 | 0 7 54.60 | .028 | 0 53 53.1 | .29 | 10 17.3 |
| 19 | 0 7 30.14 | 1.009 | 0 56 22.3 | .15 | 10 13.0 |
| 20 | 0 7 6.14 | 0.990 | 0 58 48.1 | 6.01 | 10 8.7 |
| 21 | 0 6 42.61 | 0.970 | 1 1 10.4 | 5.86 | 10 4.4 |
| 22 | 0 6 19.57 | .949 | 1 3 29.1 | .71 | 10 0.1 |
| 23 | 0 5 57.04 | .928 | 1 5 44.1 | .55 | 9 55.8 |
| 24 | 0 5 35.03 | .906 | 1 7 55.3 | .39 | 9 51.5 |
| 25 | 0 5 13.57 | .883 | 1 10 2.6 | .23 | 9 47.2 |
| 26 | 0 4 52.66 | 0.859 | 1 12 6.0 | 5.06 | 9 42.9 |
| 27 | 0 4 32.33 | .835 | 1 14 5.3 | 4.89 | 9 38.7 |
| 28 | 0 4 12.58 | .810 | 1 16 0.5 | .72 | 9 34.4 |
| 29 | 0 3 53.44 | .785 | 1 17 51.5 | .54 | 9 30.1 |
| 30 | 0 3 34.92 | .759 | 1 19 38.1 | .36 | 9 25.9 |
| 31 | 0 3 17.02 | 0.733 | 1 21 20.3 | 4.17 | 9 21.7 |
| 32 | 0 2 59.76 | 0.706 | −1 22 58.1 | 3.96 | 9 17.5 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 23.5 | 23.3 | 23.0 | 22.5 |
| Horizontal Parallax | 2.2 | 2.2 | 2.1 | 2.1 |

| | NOVEMBER. | | | | | | DECEMBER. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Day of the Month. | GREENWICH MEAN TIME. | | | | | Day of the Month. | GREENWICH MEAN TIME. | | | | |
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. | | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | | | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. | | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 0 2 59.76 | 0.706 | −1 22 58.1 | 3.98 | 9 17.5 | 1 | 23 59 54.62 | 0.213 | −1 34 19.0 | 2.16 | 7 16.6 |
| 2 | 0 2 43.15 | .678 | 1 24 31.3 | .79 | 9 13.3 | 2 | 0 0 0.11 | .244 | 1 33 24.4 | .38 | 7 12.8 |
| 3 | 0 2 27.21 | .650 | 1 25 59.9 | .60 | 9 9.1 | 3 | 0 0 6.36 | .276 | 1 32 25.0 | .59 | 7 8.9 |
| 4 | 0 2 11.94 | .622 | 1 27 23.9 | .40 | 9 4.9 | 4 | 0 0 13.36 | .307 | 1 31 20.7 | .79 | 7 5.1 |
| 5 | 0 1 57.35 | .593 | 1 28 43.2 | .20 | 9 0.7 | 5 | 0 0 21.11 | .338 | 1 30 11.5 | 2.99 | 7 1.3 |
| 6 | 0 1 43.45 | 0.564 | 1 29 57.7 | 3.00 | 8 56.5 | 6 | 0 0 29.60 | 0.369 | 1 28 57.4 | 3.19 | 6 57.5 |
| 7 | 0 1 30.25 | .535 | 1 31 7.4 | 2.80 | 8 52.4 | 7 | 0 0 38.83 | .400 | 1 27 38.5 | .39 | 6 53.7 |
| 8 | 0 1 17.75 | .506 | 1 32 12.3 | .60 | 8 48.3 | 8 | 0 0 48.80 | .431 | 1 26 14.9 | .59 | 6 49.9 |
| 9 | 0 1 5.96 | .476 | 1 33 12.4 | .40 | 8 44.2 | 9 | 0 0 59.50 | .461 | 1 24 46.6 | .78 | 6 46.2 |
| 10 | 0 0 54.88 | .446 | 1 34 7.7 | .20 | 8 40.1 | 10 | 0 1 10.92 | .491 | 1 23 13.6 | 3.97 | 6 42.5 |
| 11 | 0 0 44.53 | 0.416 | 1 34 58.1 | 2.00 | 8 36.0 | 11 | 0 1 23.07 | 0.521 | 1 21 36.0 | 4.16 | 6 38.8 |
| 12 | 0 0 34.90 | .386 | 1 35 43.6 | 1.79 | 8 31.9 | 12 | 0 1 35.92 | .551 | 1 19 53.8 | .35 | 6 35.1 |
| 13 | 0 0 26.00 | .355 | 1 36 24.2 | .59 | 8 27.8 | 13 | 0 1 49.48 | .580 | 1 18 7.0 | .54 | 6 31.4 |
| 14 | 0 0 17.84 | .324 | 1 36 59.9 | .39 | 8 23.7 | 14 | 0 2 3.75 | .609 | 1 16 15.7 | .73 | 6 27.7 |
| 15 | 0 0 10.42 | .293 | 1 37 30.6 | 1.18 | 8 19.7 | 15 | 0 2 18.72 | .638 | 1 14 20.0 | 4.92 | 6 24.0 |
| 16 | 0 0 3.75 | 0.262 | 1 37 56.3 | 0.97 | 8 15.7 | 16 | 0 2 34.38 | 0.667 | 1 12 19.9 | 5.10 | 6 20.3 |
| 17 | 23 59 57.83 | .231 | 1 38 17.0 | .76 | 8 11.7 | 17 | 0 2 50.73 | .695 | 1 10 15.4 | .28 | 6 16.7 |
| 18 | 23 59 52.65 | .200 | 1 38 32.7 | .55 | 8 7.6 | 18 | 0 3 7.77 | .723 | 1 8 6.5 | .46 | 6 13.1 |
| 19 | 23 59 48.23 | .168 | 1 38 43.4 | .34 | 8 3.6 | 19 | 0 3 25.49 | .751 | 1 5 53.3 | .64 | 6 9.4 |
| 20 | 23 59 44.56 | .136 | 1 38 49.0 | −.13 | 7 59.6 | 20 | 0 3 43.88 | .779 | 1 3 35.8 | 5.82 | 6 5.8 |
| 21 | 23 59 41.65 | 0.105 | 1 38 49.7 | +.06 | 7 55.7 | 21 | 0 4 2.94 | 0.807 | 1 1 14.0 | 6.00 | 6 2.2 |
| 22 | 23 59 39.51 | .074 | 1 38 45.3 | .29 | 7 51.7 | 22 | 0 4 22.66 | .835 | 0 58 47.9 | .17 | 5 58.6 |
| 23 | 23 59 38.13 | .042 | 1 38 35.8 | .50 | 7 47.8 | 23 | 0 4 43.04 | .862 | 0 56 17.6 | .34 | 5 55.0 |
| 24 | 23 59 37.51 | −.010 | 1 38 21.3 | .71 | 7 43.8 | 24 | 0 5 4.07 | .889 | 0 53 43.2 | .51 | 5 51.4 |
| 25 | 23 59 37.66 | +.022 | 1 38 1.8 | 0.92 | 7 39.9 | 25 | 0 5 25.75 | .916 | 0 51 4.8 | .68 | 5 47.8 |
| 26 | 23 59 38.57 | 0.054 | 1 37 37.2 | 1.13 | 7 36.0 | 26 | 0 5 48.07 | 0.943 | 0 48 22.3 | 6.85 | 5 44.3 |
| 27 | 23 59 40.25 | .086 | 1 37 7.6 | .34 | 7 32.1 | 27 | 0 6 11.03 | .969 | 0 45 35.8 | 7.02 | 5 40.7 |
| 28 | 23 59 42.70 | .118 | 1 36 33.0 | .55 | 7 28.2 | 28 | 0 6 34.61 | 0.995 | 0 42 45.3 | .18 | 5 37.1 |
| 29 | 23 59 45.91 | .150 | 1 35 53.4 | .76 | 7 24.3 | 29 | 0 6 58.82 | 1.021 | 0 39 50.9 | .34 | 5 33.6 |
| 30 | 23 59 49.88 | .182 | 1 35 8.7 | 1.97 | 7 20.4 | 30 | 0 7 23.64 | .047 | 0 36 52.7 | .51 | 5 30.1 |
| 31 | 23 59 54.62 | 0.213 | 1 34 19.0 | 2.18 | 7 16.6 | 31 | 0 7 49.06 | 1.072 | 0 33 50.6 | 7.67 | 5 26.6 |
| 32 | 0 0 0.11 | 0.244 | −1 33 24.4 | 2.38 | 7 12.8 | 32 | 0 8 15.09 | 1.097 | −0 30 44.7 | 7.82 | 5 23.1 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. | Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 22.4 | 21.8 | 21.2 | 20.5 | Polar Semidiameter | 20.5 | 19.8 | 19.2 | 18.6 |
| Horizontal Parallax | 2.1 | 2.0 | 2.0 | 1.9 | Horizontal Parallax | 1.9 | 1.8 | 1.8 | 1.7 |

# SATURN, 1856.

## JANUARY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 5 40 23.20 | −0.847 | +22 11 16.7 | −0.06 | 10 57.1 |
| 2 | 5 40 2.96 | .840 | 22 11 15.3 | .06 | 10 52.8 |
| 3 | 5 39 42.89 | .833 | 22 11 14.0 | .05 | 10 48.6 |
| 4 | 5 39 23.00 | .825 | 22 11 12.8 | .05 | 10 44.3 |
| 5 | 5 39 3.32 | .816 | 22 11 11.7 | .04 | 10 40.0 |
| 6 | 5 38 43.86 | 0.807 | 22 11 10.8 | 0.03 | 10 35.8 |
| 7 | 5 38 24.62 | .797 | 22 11 10.0 | .03 | 10 31.5 |
| 8 | 5 38 5.61 | .787 | 22 11 9.3 | .03 | 10 27.3 |
| 9 | 5 37 46.84 | .776 | 22 11 8.7 | .02 | 10 23.1 |
| 10 | 5 37 28.31 | .765 | 22 11 8.2 | .02 | 10 18.8 |
| 11 | 5 37 10.09 | 0.754 | 22 11 7.8 | −0.01 | 10 14.6 |
| 12 | 5 36 52.13 | .743 | 22 11 7.7 | .00 | 10 10.4 |
| 13 | 5 36 34.44 | .731 | 22 11 7.7 | +0.01 | 10 6.1 |
| 14 | 5 36 17.07 | .719 | 22 11 7.9 | .01 | 10 1.9 |
| 15 | 5 36 0.02 | .706 | 22 11 8.2 | .01 | 9 57.7 |
| 16 | 5 35 43.24 | 0.693 | 22 11 8.6 | 0.02 | 9 53.5 |
| 17 | 5 35 26.78 | .680 | 22 11 9.3 | .03 | 9 49.3 |
| 18 | 5 35 10.65 | .666 | 22 11 10.2 | .04 | 9 45.1 |
| 19 | 5 34 54.88 | .651 | 22 11 11.3 | .05 | 9 40.9 |
| 20 | 5 34 39.47 | .636 | 22 11 12.6 | .06 | 9 36.7 |
| 21 | 5 34 24.47 | 0.626 | 22 11 14.1 | 0.07 | 9 32.6 |
| 22 | 5 34 9.77 | .606 | 22 11 15.9 | .08 | 9 28.4 |
| 23 | 5 33 55.48 | .590 | 22 11 17.9 | .09 | 9 24.2 |
| 24 | 5 33 41.49 | .573 | 22 11 20.2 | .10 | 9 20.1 |
| 25 | 5 33 27.95 | .557 | 22 11 22.8 | .11 | 9 15.9 |
| 26 | 5 33 14.77 | 0.541 | 22 11 25.6 | 0.12 | 9 11.8 |
| 27 | 5 33 1.99 | .525 | 22 11 28.7 | .13 | 9 7.6 |
| 28 | 5 32 49.61 | .508 | 22 11 32.1 | .15 | 9 3.5 |
| 29 | 5 32 37.66 | .490 | 22 11 35.8 | .16 | 8 59.3 |
| 30 | 5 32 26.14 | .472 | 22 11 39.8 | .17 | 8 55.2 |
| 31 | 5 32 15.01 | 0.454 | 22 11 44.0 | 0.18 | 8 51.0 |
| 32 | 5 32 4.32 | −0.436 | +22 11 48.5 | +0.19 | 8 47.0 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 9.7 | 9.6 | 9.5 | 9.4 |
| Horizontal Parallax | 1.1 | 1.1 | 1.0 | 1.0 |

## FEBRUARY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
|---|---|---|---|---|---|
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 5 32 4.32 | −0.436 | +22 11 48.5 | +0.19 | 8 47.0 |
| 2 | 5 31 54.06 | .418 | 22 11 53.3 | .21 | 8 43.0 |
| 3 | 5 31 44.25 | .399 | 22 11 58.5 | .22 | 8 38.8 |
| 4 | 5 31 34.89 | .380 | 22 12 4.0 | .24 | 8 34.7 |
| 5 | 5 31 25.97 | .362 | 22 12 9.9 | .25 | 8 30.6 |
| 6 | 5 31 17.51 | 0.343 | 22 12 16.1 | 0.26 | 8 26.6 |
| 7 | 5 31 9.50 | .324 | 22 12 22.6 | .28 | 8 22.5 |
| 8 | 5 31 1.96 | .304 | 22 12 29.5 | .29 | 8 18.5 |
| 9 | 5 30 54.89 | .285 | 22 12 36.7 | .31 | 8 14.4 |
| 10 | 5 30 48.29 | .265 | 22 12 44.3 | .32 | 8 10.4 |
| 11 | 5 30 42.16 | 0.246 | 22 12 52.2 | 0.33 | 8 6.4 |
| 12 | 5 30 36.51 | .226 | 22 13 0.4 | .35 | 8 2.3 |
| 13 | 5 30 31.34 | .206 | 22 13 9.0 | .36 | 7 58.3 |
| 14 | 5 30 26.65 | .186 | 22 13 18.0 | .38 | 7 54.4 |
| 15 | 5 30 22.43 | .166 | 22 13 27.4 | .39 | 7 50.4 |
| 16 | 5 30 18.70 | 0.145 | 22 13 37.1 | 0.41 | 7 46.3 |
| 17 | 5 30 15.46 | .125 | 22 13 47.1 | .42 | 7 42.3 |
| 18 | 5 30 12.70 | .106 | 22 13 57.5 | .44 | 7 38.4 |
| 19 | 5 30 10.42 | .085 | 22 14 8.3 | .45 | 7 34.4 |
| 20 | 5 30 8.62 | .064 | 22 14 19.4 | .47 | 7 30.4 |
| 21 | 5 30 7.33 | 0.044 | 22 14 30.9 | 0.48 | 7 26.5 |
| 22 | 5 30 6.52 | .024 | 22 14 42.7 | .50 | 7 22.5 |
| 23 | 5 30 6.19 | −0.004 | 22 14 54.9 | .51 | 7 18.6 |
| 24 | 5 30 6.34 | +0.016 | 22 15 7.4 | .52 | 7 14.8 |
| 25 | 5 30 6.98 | .037 | 22 15 20.2 | .54 | 7 10.8 |
| 26 | 5 30 8.11 | 0.057 | 22 15 33.4 | 0.55 | 7 6.9 |
| 27 | 5 30 9.74 | .078 | 22 15 46.9 | .57 | 7 3.0 |
| 28 | 5 30 11.85 | .098 | 22 16 0.8 | .58 | 6 59.1 |
| 29 | 5 30 14.44 | .118 | 22 16 15.0 | .59 | 6 55.2 |
| 30 | 5 30 17.51 | .138 | 22 16 29.5 | .61 | 6 51.4 |
| 31 | 5 30 21.08 | 0.159 | 22 16 44.4 | 0.62 | 6 47.5 |
| 32 | 5 30 25.14 | +0.180 | +22 16 59.6 | +0.64 | 6 43.7 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 9.4 | 9.2 | 9.1 | 8.9 |
| Horizontal Parallax | 1.0 | 1.0 | 1.0 | 1.0 |

| MARCH. | | | | | | APRIL. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | GREENWICH MEAN TIME. | | | | | | GREENWICH MEAN TIME. | | | | |
| Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. | Day of the Month. | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | *Noon.* | *Noon.* | *Noon.* | *Noon.* | | | *Noon.* | *Noon.* | *Noon.* | *Noon.* | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. | | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 5 30 17.51 | +0.138 | +22 16 29.5 | +0.61 | 6 51.4 | 1 | 5 35 43.74 | +0.719 | +22 26 5.5 | +0.88 | 4 54.9 |
| 2 | 5 30 21.08 | .159 | 22 16 44.4 | .62 | 6 47.5 | 2 | 5 36 1.18 | .735 | 22 26 26.6 | .88 | 4 51.2 |
| 3 | 5 30 25.14 | .180 | 22 16 59.6 | .64 | 6 43.7 | 3 | 5 36 19.00 | .751 | 22 26 47.7 | .88 | 4 47.6 |
| 4 | 5 30 29.68 | .201 | 22 17 15.1 | .65 | 6 39.7 | 4 | 5 36 37.20 | .767 | 22 27 8.8 | .88 | 4 44.0 |
| 5 | 5 30 34.70 | .219 | 22 17 30.9 | .66 | 6 35.9 | 5 | 5 36 55.79 | .783 | 22 27 29.9 | .88 | 4 40.3 |
| 6 | 5 30 40.19 | 0.239 | 22 17 47.0 | 0.68 | 6 32.0 | 6 | 5 37 14.76 | 0.799 | 22 27 50.9 | 0.88 | 4 36.7 |
| 7 | 5 30 46.17 | .259 | 22 18 3.5 | .69 | 6 28.2 | 7 | 5 37 34.12 | .814 | 22 28 12.0 | .88 | 4 33.1 |
| 8 | 5 30 52.64 | .279 | 22 18 20.2 | .70 | 6 24.4 | 8 | 5 37 53.83 | .829 | 22 28 33.1 | .88 | 4 29.5 |
| 9 | 5 30 59.58 | .299 | 22 18 37.2 | .71 | 6 20.6 | 9 | 5 38 13.89 | .844 | 22 28 54.1 | .88 | 4 25.9 |
| 10 | 5 31 6.99 | .319 | 22 18 54.5 | .72 | 6 16.8 | 10 | 5 38 34.34 | .859 | 22 29 15.1 | .87 | 4 22.3 |
| 11 | 5 31 14.90 | 0.339 | 22 19 12.0 | 0.74 | 6 13.0 | 11 | 5 38 55.14 | 0.874 | 22 29 35.9 | 0.87 | 4 18.8 |
| 12 | 5 31 23.26 | .359 | 22 19 29.9 | .75 | 6 9.2 | 12 | 5 39 16.30 | .888 | 22 29 56.7 | .86 | 4 15.2 |
| 13 | 5 31 32.09 | .378 | 22 19 48.0 | .76 | 6 5.4 | 13 | 5 39 37.79 | .903 | 22 30 17.4 | .86 | 4 11.6 |
| 14 | 5 31 41.37 | .397 | 22 20 6.3 | .77 | 6 1.6 | 14 | 5 39 59.61 | .916 | 22 30 38.0 | .86 | 4 8.0 |
| 15 | 5 31 51.10 | .416 | 22 20 24.8 | .78 | 5 57.8 | 15 | 5 40 21.77 | .930 | 22 30 58.6 | .85 | 4 4.5 |
| 16 | 5 32 1.32 | 0.435 | 22 20 43.5 | 0.78 | 5 54.1 | 16 | 5 40 44.26 | 0.944 | 22 31 19.0 | 0.85 | 4 0.9 |
| 17 | 5 32 11.98 | .454 | 22 21 2.4 | .79 | 5 50.3 | 17 | 5 41 7.09 | .958 | 22 31 39.3 | .84 | 3 57.3 |
| 18 | 5 32 23.10 | .472 | 22 21 21.6 | .80 | 5 46.6 | 18 | 5 41 30.23 | .971 | 22 31 59.4 | .84 | 3 53.8 |
| 19 | 5 32 34.65 | .490 | 22 21 41.0 | .81 | 5 42.8 | 19 | 5 41 53.68 | .984 | 22 32 19.4 | .83 | 3 50.3 |
| 20 | 5 32 46.63 | .509 | 22 22 0.6 | .82 | 5 39.1 | 20 | 5 42 17.45 | 0.997 | 22 32 39.2 | .82 | 3 46.7 |
| 21 | 5 32 59.06 | 0.527 | 22 22 20.3 | 0.82 | 5 35.4 | 21 | 5 42 41.52 | 1.010 | 22 32 58.9 | 0.82 | 3 43.2 |
| 22 | 5 33 11.92 | .545 | 22 22 40.2 | .83 | 5 31.7 | 22 | 5 43 5.91 | .022 | 22 33 18.4 | .81 | 3 39.7 |
| 23 | 5 33 25.23 | .563 | 22 23 0.2 | .83 | 5 28.0 | 23 | 5 43 30.58 | .034 | 22 33 37.7 | .80 | 3 36.1 |
| 24 | 5 33 38.95 | .580 | 22 23 20.3 | .84 | 5 24.3 | 24 | 5 43 55.58 | .047 | 22 33 56.8 | .79 | 3 32.6 |
| 25 | 5 33 53.09 | .597 | 22 23 40.6 | .85 | 5 20.6 | 25 | 5 44 20.80 | .059 | 22 34 15.6 | .78 | 3 29.1 |
| 26 | 5 34 7.66 | 0.616 | 22 24 1.0 | 0.85 | 5 16.9 | 26 | 5 44 46.34 | 1.071 | 22 34 34.2 | 0.77 | 3 25.6 |
| 27 | 5 34 22.65 | .634 | 22 24 21.5 | .86 | 5 13.2 | 27 | 5 45 12.17 | .082 | 22 34 52.7 | .76 | 3 22.1 |
| 28 | 5 34 38.06 | .650 | 22 24 42.1 | .86 | 5 9.5 | 28 | 5 45 38.26 | .093 | 22 35 10.9 | .75 | 3 18.6 |
| 29 | 5 34 53.87 | .667 | 22 25 2.8 | .86 | 5 5.8 | 29 | 5 46 4.61 | .105 | 22 35 28.8 | .74 | 3 15.1 |
| 30 | 5 35 10.08 | .685 | 22 25 23.6 | .87 | 5 2.2 | 30 | 5 46 31.27 | .116 | 22 35 46.4 | .73 | 3 11.6 |
| 31 | 5 35 26.71 | 0.702 | 22 25 44.5 | 0.87 | 4 58.5 | 31 | 5 46 58.17 | 1.127 | 22 36 3.7 | 0.72 | 3 8.1 |
| 32 | 5 35 43.74 | +0.719 | +22 26 5.5 | +0.88 | 4 54.9 | 32 | 5 47 25.34 | +1.137 | +22 36 20.8 | +0.71 | 3 4.7 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. | Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|---|---|---|---|---|
| | ″ | ″ | ″ | ″ | | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 8.9 | 8.8 | 8.6 | 8.5 | Polar Semidiameter | 8.4 | 8.3 | 8.1 | 8.0 |
| Horizontal Parallax | 1.0 | 1.0 | 0.9 | 0.9 | Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

## MAY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 5 46 58.17 | +1.127 | +22 36 3.7 | +0.72 | 3 8.1 |
| 2 | 5 47 25.34 | .137 | 22 36 20.8 | .71 | 3 4.7 |
| 3 | 5 47 52.75 | .147 | 22 36 37.6 | .70 | 3 1.2 |
| 4 | 5 48 20.40 | .158 | 22 36 54.1 | .68 | 2 57.7 |
| 5 | 5 48 48.32 | .168 | 22 37 10.3 | .67 | 2 54.2 |
| 6 | 5 49 16.47 | 1.178 | 22 37 26.2 | 0.66 | 2 50.9 |
| 7 | 5 49 44.86 | .187 | 22 37 41.6 | .64 | 2 47.3 |
| 8 | 5 50 13.46 | .196 | 22 37 56.8 | .62 | 2 43.9 |
| 9 | 5 50 42.27 | .205 | 22 38 11.6 | .61 | 2 40.4 |
| 10 | 5 51 11.31 | .214 | 22 38 26.1 | .60 | 2 37.0 |
| 11 | 5 51 40.56 | 1.223 | 22 38 40.3 | 0.58 | 2 33.5 |
| 12 | 5 52 10.02 | .231 | 22 38 54.0 | .56 | 2 30.1 |
| 13 | 5 52 39.67 | .239 | 22 39 7.8 | .55 | 2 26.6 |
| 14 | 5 53 9.52 | .247 | 22 39 20.2 | .52 | 2 23.2 |
| 15 | 5 53 39.58 | .256 | 22 39 32.6 | .51 | 2 19.8 |
| 16 | 5 54 9.80 | 1.264 | 22 39 44.7 | 0.49 | 2 16.3 |
| 17 | 5 54 40.22 | .271 | 22 39 56.3 | .48 | 2 12.9 |
| 18 | 5 55 10.80 | .278 | 22 40 7.5 | .46 | 2 9.5 |
| 19 | 5 55 41.54 | .286 | 22 40 18.3 | .44 | 2 6.1 |
| 20 | 5 56 12.48 | .293 | 22 40 28.7 | .42 | 2 2.6 |
| 21 | 5 56 43.59 | 1.300 | 22 40 38.6 | 0.40 | 1 59.2 |
| 22 | 5 57 14.85 | .306 | 22 40 48.0 | .38 | 1 55.8 |
| 23 | 5 57 46.25 | .312 | 22 40 57.0 | .37 | 1 52.4 |
| 24 | 5 58 17.81 | .318 | 22 41 5.6 | .36 | 1 49.0 |
| 25 | 5 58 49.52 | .324 | 22 41 13.8 | .33 | 1 45.6 |
| 26 | 5 59 21.36 | 1.330 | 22 41 21.5 | 0.31 | 1 42.2 |
| 27 | 5 59 53.36 | .336 | 22 41 28.7 | .29 | 1 38.8 |
| 28 | 6 0 25.47 | .341 | 22 41 35.4 | .27 | 1 35.4 |
| 29 | 6 0 57.69 | .346 | 22 41 41.6 | .25 | 1 32.0 |
| 30 | 6 1 30.06 | .351 | 22 41 47.3 | .23 | 1 28.6 |
| 31 | 6 2 2.56 | 1.356 | 22 41 52.5 | 0.21 | 1 25.2 |
| 32 | 6 2 35.18 | +1.361 | +22 41 57.2 | +0.18 | 1 21.8 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 8.0 | 8.0 | 7.9 | 7.8 |
| Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

## JUNE.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 2 35.18 | +1.361 | +22 41 57.2 | +0.18 | 1 21.8 |
| 2 | 6 3 7.89 | .365 | 22 42 1.4 | .16 | 1 18.4 |
| 3 | 6 3 40.69 | .369 | 22 42 5.1 | .15 | 1 15.0 |
| 4 | 6 4 13.60 | .373 | 22 42 8.4 | .13 | 1 11.6 |
| 5 | 6 4 46.61 | .377 | 22 42 11.2 | .10 | 1 8.2 |
| 6 | 6 5 19.72 | 1.381 | 22 42 13.4 | 0.08 | 1 4.9 |
| 7 | 6 5 52.90 | .384 | 22 42 15.1 | .06 | 1 1.5 |
| 8 | 6 6 26.15 | .387 | 22 42 16.3 | .03 | 0 58.1 |
| 9 | 6 6 59.48 | .390 | 22 42 16.8 | +0.01 | 0 54.7 |
| 10 | 6 7 32.88 | .393 | 22 42 16.8 | −0.01 | 0 51.3 |
| 11 | 6 8 6.35 | 1.396 | 22 42 16.3 | 0.03 | 0 48.1 |
| 12 | 6 8 39.87 | .399 | 22 42 15.3 | .05 | 0 44.6 |
| 13 | 6 9 13.44 | .401 | 22 42 13.8 | .07 | 0 41.2 |
| 14 | 6 9 47.07 | .403 | 22 42 11.9 | .09 | 0 37.8 |
| 15 | 6 10 20.73 | .405 | 22 42 9.4 | .12 | 0 34.5 |
| 16 | 6 10 54.44 | 1.407 | 22 42 6.3 | 0.14 | 0 31.1 |
| 17 | 6 11 28.18 | .409 | 22 42 2.7 | .16 | 0 27.7 |
| 18 | 6 12 1.96 | .411 | 22 41 58.6 | .18 | 0 24.3 |
| 19 | 6 12 35.79 | .413 | 22 41 54.1 | .20 | 0 21.0 |
| 20 | 6 13 9.65 | .414 | 22 41 48.9 | .22 | 0 17.6 |
| 21 | 6 13 43.52 | 1.413 | 22 41 43.2 | 0.25 | 0 14.2 |
| 22 | 6 14 17.40 | .412 | 22 41 37.0 | .27 | 0 10.9 |
| 23 | 6 14 51.28 | .412 | 22 41 30.3 | .28 | 0 7.5 |
| 24 | 6 15 25.17 | .412 | 22 41 23.2 | .31 | 0 4.1 |
| 25 | 6 15 59.07 | .412 | 22 41 15.4 | .33 | 0 0.8<br>23 57.4 |
| 26 | 6 16 32.98 | 1.412 | 22 41 7.1 | 0.36 | 23 54.0 |
| 27 | 6 17 6.87 | .412 | 22 40 58.3 | .38 | 23 50.6 |
| 28 | 6 17 40.74 | .411 | 22 40 49.0 | .39 | 23 47.3 |
| 29 | 6 18 14.60 | .411 | 22 40 39.3 | .42 | 23 43.9 |
| 30 | 6 18 48.46 | .411 | 22 40 29.0 | .44 | 23 40.5 |
| 31 | 6 19 22.30 | 1.410 | 22 40 18.2 | 0.46 | 23 37.2 |
| 32 | 6 19 56.11 | +1.408 | +22 40 6.9 | −0.48 | 23 33.8 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 7.8 | 7.8 | 7.8 | 7.8 |
| Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

## JULY.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 19 22.30 | +1.410 | +22 40 18.2 | −0.46 | 23 37.2 |
| 2 | 6 19 56.11 | .408 | 22 40 6.9 | .48 | 23 33.8 |
| 3 | 6 20 29.86 | .406 | 22 39 55.1 | .51 | 23 30.4 |
| 4 | 6 21 3.55 | .404 | 22 39 42.7 | .52 | 23 27.1 |
| 5 | 6 21 37.21 | .402 | 22 39 29.9 | .54 | 23 23.7 |
| 6 | 6 22 10.84 | 1.400 | 22 39 16.7 | 0.56 | 23 20.3 |
| 7 | 6 22 44.40 | .396 | 22 39 3.0 | .58 | 23 16.9 |
| 8 | 6 23 17.89 | .395 | 22 38 48.8 | .61 | 23 13.5 |
| 9 | 6 23 51.33 | .392 | 22 38 34.1 | .62 | 23 10.2 |
| 10 | 6 24 24.70 | .389 | 22 38 19.0 | .65 | 23 6.8 |
| 11 | 6 24 58.01 | 1.386 | 22 38 3.3 | 0.66 | 23 3.4 |
| 12 | 6 25 31.23 | .383 | 22 37 47.2 | .68 | 23 0.0 |
| 13 | 6 26 4.36 | .379 | 22 37 30.7 | .69 | 22 56.6 |
| 14 | 6 26 37.41 | .376 | 22 37 13.8 | .71 | 22 53.2 |
| 15 | 6 27 10.38 | .371 | 22 36 56.4 | .74 | 22 49.9 |
| 16 | 6 27 43.25 | 1.367 | 22 36 38.5 | 0.75 | 22 46.5 |
| 17 | 6 28 16.01 | .363 | 22 36 20.2 | .77 | 22 43.1 |
| 18 | 6 28 48.68 | .359 | 22 36 1.5 | .79 | 22 39.7 |
| 19 | 6 29 21.25 | .354 | 22 35 42.3 | .81 | 22 36.3 |
| 20 | 6 29 53.69 | .349 | 22 35 22.7 | .83 | 22 32.9 |
| 21 | 6 30 26.02 | 1.344 | 22 35 2.8 | 0.84 | 22 29.5 |
| 22 | 6 30 58.22 | .339 | 22 34 42.5 | .86 | 22 26.1 |
| 23 | 6 31 30.30 | .334 | 22 34 21.8 | .87 | 22 22.7 |
| 24 | 6 32 2.26 | .328 | 22 34 0.8 | .88 | 22 19.3 |
| 25 | 6 32 34.08 | .322 | 22 33 39.5 | .90 | 22 15.9 |
| 26 | 6 33 5.77 | 1.317 | 22 33 17.8 | 0.91 | 22 12.5 |
| 27 | 6 33 37.30 | .311 | 22 32 55.8 | .92 | 22 9.1 |
| 28 | 6 34 8.69 | .305 | 22 32 33.5 | .93 | 22 5.6 |
| 29 | 6 34 39.93 | .299 | 22 62 11.0 | .95 | 22 2.2 |
| 30 | 6 35 11.02 | .293 | 22 31 48.1 | .96 | 21 58.8 |
| 31 | 6 35 41.95 | 1.286 | 22 31 24.9 | 0.97 | 21 55.4 |
| 32 | 6 36 12.70 | +1.278 | +22 31 1.4 | −0.99 | 21 52.0 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 7.8 | 7.8 | 7.9 | 7.9 |
| Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

## AUGUST.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 36 12.70 | +1.278 | +22 31 1.4 | −0.99 | 21 52.0 |
| 2 | 6 36 43.27 | .270 | 22 30 37.6 | 0.99 | 21 48.5 |
| 3 | 6 37 13.66 | .262 | 22 30 13.7 | 1.00 | 21 45.3 |
| 4 | 6 37 43.87 | .254 | 22 29 49.5 | .02 | 21 41.7 |
| 5 | 6 38 13.89 | .246 | 22 29 25.0 | .02 | 21 38.2 |
| 6 | 6 38 43.71 | 1.238 | 22 29 0.3 | 1.03 | 21 34.8 |
| 7 | 6 39 13.33 | .230 | 22 28 35.4 | .04 | 21 31.4 |
| 8 | 6 39 42.76 | .222 | 22 28 10.2 | .05 | 21 27.9 |
| 9 | 6 40 11.99 | .214 | 22 27 44.7 | .06 | 21 24.5 |
| 10 | 6 40 41.01 | .204 | 22 27 19.1 | .07 | 21 21.0 |
| 11 | 6 41 9.80 | 1.194 | 22 26 53.4 | 1.07 | 21 17.6 |
| 12 | 6 41 38.36 | .186 | 22 26 27.6 | .07 | 21 14.1 |
| 13 | 6 42 6.71 | .176 | 22 26 1.7 | .08 | 21 10.6 |
| 14 | 6 42 34.83 | .167 | 22 25 35.6 | .09 | 21 7 1 |
| 15 | 6 43 2.73 | .157 | 22 25 9.4 | .09 | 21 3.7 |
| 16 | 6 43 30.38 | 1.147 | 22 24 43.1 | 1.09 | 21 0.2 |
| 17 | 6 43 57.78 | .137 | 22 24 16.7 | .10 | 20 56.7 |
| 18 | 6 44 24.94 | .127 | 22 23 50.4 | .10 | 20 53.2 |
| 19 | 6 44 51.86 | .116 | 22 23 24.1 | .11 | 20 49.7 |
| 20 | 6 45 18.52 | .106 | 22 22 57.7 | .11 | 20 46.3 |
| 21 | 6 45 44.91 | 1.094 | 22 22 31.0 | 1.11 | 20 42.8 |
| 22 | 6 46 11.05 | .083 | 22 22 4.2 | .12 | 20 39.3 |
| 23 | 6 46 36.92 | .072 | 22 21 37.3 | .12 | 20 35.8 |
| 24 | 6 47 2.51 | .061 | 22 21 10.5 | .11 | 20 32.3 |
| 25 | 6 47 27.83 | .049 | 22 20 43.8 | .11 | 20 28.7 |
| 26 | 6 47 52.85 | 1.037 | 22 20 17.2 | 1.10 | 20 25.2 |
| 27 | 6 48 17.57 | .025 | 22 19 50.7 | .10 | 20 21.7 |
| 28 | 6 48 42.02 | .013 | 22 19 24.2 | .10 | 20 18.2 |
| 29 | 6 49 6.18 | .000 | 22 18 57.8 | .10 | 20 14.6 |
| 30 | 6 49 30.03 | 0.987 | 22 18 31.4 | .10 | 20 11.1 |
| 31 | 6 49 53.56 | 0.974 | 22 18 5.2 | 1.09 | 20 7.5 |
| 32 | 6 50 16.77 | +0.963 | +22 17 39.2 | −1.08 | 20 4.0 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 7.9 | 8.1 | 8.1 | 8.2 |
| Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

# SATURN, 1856.

## SEPTEMBER.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 50 16.77 | +0.961 | +22 17 39.2 | −1.08 | 20 4.0 |
| 2 | 6 50 39.70 | .948 | 22 17 13.3 | .08 | 20 0.4 |
| 3 | 6 51 2.29 | .934 | 22 16 47.5 | .07 | 19 56.9 |
| 4 | 6 51 24.55 | .920 | 22 16 21.9 | .06 | 19 53.3 |
| 5 | 6 51 46.47 | .906 | 22 15 56.5 | .06 | 19 49.7 |
| 6 | 6 52 8.05 | 0.892 | 22 15 31.3 | 1.05 | 19 46.1 |
| 7 | 6 52 29.28 | .878 | 22 15 6.4 | .04 | 19 42.6 |
| 8 | 6 52 50.18 | .864 | 22 14 41.8 | .03 | 19 39.0 |
| 9 | 6 53 10.73 | .850 | 22 14 17.3 | .02 | 19 35.4 |
| 10 | 6 53 30.92 | .836 | 22 13 53.1 | 1.00 | 19 31.8 |
| 11 | 6 53 50.75 | 0.820 | 22 13 29.2 | 0.98 | 19 28.2 |
| 12 | 6 54 10.24 | .805 | 22 13 5.7 | .97 | 19 24.6 |
| 13 | 6 54 29.35 | .789 | 22 12 42.5 | .97 | 19 20.9 |
| 14 | 6 54 48.10 | .773 | 22 12 19.5 | .95 | 19 17.3 |
| 15 | 6 55 6.47 | .758 | 22 11 56.9 | .93 | 19 13.7 |
| 16 | 6 55 24.46 | 0.743 | 22 11 34.6 | 0.92 | 19 10.0 |
| 17 | 6 55 42.10 | .727 | 22 11 12.6 | .91 | 19 6.4 |
| 18 | 6 55 59.35 | .711 | 22 10 51.0 | .89 | 19 2.7 |
| 19 | 6 56 16.21 | .697 | 22 10 29.8 | .87 | 18 59.1 |
| 20 | 6 56 32.67 | .678 | 22 10 9.0 | .86 | 18 55.4 |
| 21 | 6 56 48.73 | 0.660 | 22 9 48.6 | 0.83 | 18 51.7 |
| 22 | 6 57 4.38 | .644 | 22 9 28.8 | .81 | 18 48.1 |
| 23 | 6 57 19.64 | .627 | 22 9 9.4 | .80 | 18 44.4 |
| 24 | 6 57 34.49 | .610 | 22 8 50.4 | .78 | 18 40.7 |
| 25 | 6 57 48.92 | .592 | 22 8 31.9 | .76 | 18 37.0 |
| 26 | 6 58 2.93 | 0.575 | 22 8 13.8 | 0.74 | 18 33.3 |
| 27 | 6 58 16.52 | .558 | 22 7 56.2 | .72 | 18 29.6 |
| 28 | 6 58 29.69 | .540 | 22 7 39.1 | .70 | 18 25.9 |
| 29 | 6 58 42.42 | .521 | 22 7 22.5 | .68 | 18 22.1 |
| 30 | 6 58 54.71 | .502 | 22 7 6.5 | .66 | 18 18.4 |
| 31 | 6 59 6.56 | 0.485 | 22 6 51.1 | 0.63 | 18 14.7 |
| 32 | 6 59 17.99 | +0.467 | +22 6 36.3 | −0.60 | 18 10.9 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 8.2 | 8.4 | 8.5 | 8.6 |
| Horizontal Parallax | 0.9 | 0.9 | 0.9 | 0.9 |

## OCTOBER.

| Day of the Month. | GREENWICH MEAN TIME. | | | | |
|---|---|---|---|---|---|
| | Apparent Right Ascension. | Var. of R.A. for 1 hour. | Apparent Declination. | Var. of Dec. for 1 hour. | Meridian Passage. |
| | Noon. | Noon. | Noon. | Noon. | |
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 59 6.56 | +0.485 | +22 6 51.1 | −0.63 | 18 14.7 |
| 2 | 6 59 17.99 | .467 | 22 6 36.3 | .60 | 18 10.9 |
| 3 | 6 59 28.98 | .448 | 22 6 22.2 | .58 | 18 7.2 |
| 4 | 6 59 39.51 | .429 | 22 6 8.6 | .56 | 18 3.4 |
| 5 | 6 59 49.59 | .410 | 22 5 55.6 | .53 | 17 59.6 |
| 6 | 6 59 59.22 | 0.391 | 22 5 43.2 | 0.51 | 17 55.8 |
| 7 | 7 0 8.38 | .372 | 22 5 31.3 | .48 | 17 52.0 |
| 8 | 7 0 17.10 | .354 | 22 5 20.0 | .46 | 17 48.2 |
| 9 | 7 0 25.36 | .335 | 22 5 9.4 | .43 | 17 44.5 |
| 10 | 7 0 33.16 | .316 | 22 4 59.5 | .40 | 17 40.6 |
| 11 | 7 0 40.50 | 0.296 | 22 4 50.3 | 0.37 | 17 36.8 |
| 12 | 7 0 47.38 | .277 | 22 4 41.8 | .34 | 17 33.0 |
| 13 | 7 0 53.79 | .257 | 22 4 33.9 | .31 | 17 29.2 |
| 14 | 7 0 59.73 | .238 | 22 4 26.7 | .28 | 17 25.3 |
| 15 | 7 1 5.20 | .218 | 22 4 20.2 | .25 | 17 21.5 |
| 16 | 7 1 10.20 | 0.198 | 22 4 14.4 | 0.23 | 17 17.7 |
| 17 | 7 1 14.75 | .179 | 22 4 9.2 | .21 | 17 13.8 |
| 18 | 7 1 18.81 | .160 | 22 4 4.7 | .17 | 17 9.9 |
| 19 | 7 1 22.40 | .141 | 22 4 1.0 | .14 | 17 6.1 |
| 20 | 7 1 25.50 | .120 | 22 3 58.0 | .11 | 17 2.2 |
| 21 | 7 1 28.12 | 0.100 | 22 3 55.7 | 0.08 | 16 58.3 |
| 22 | 7 1 30.23 | .080 | 22 3 54.2 | .04 | 16 54.4 |
| 23 | 7 1 31.90 | .060 | 22 3 53.5 | −0.01 | 16 50.5 |
| 24 | 7 1 33.07 | .039 | 22 3 53.5 | +0.01 | 16 46.5 |
| 25 | 7 1 33.76 | +0.019 | 22 3 54.2 | .04 | 16 42.6 |
| 26 | 7 1 33.97 | −0.001 | 22 3 55.6 | 0.08 | 16 38.7 |
| 27 | 7 1 33.66 | .022 | 22 3 57.8 | .11 | 16 34.7 |
| 28 | 7 1 32.89 | .042 | 22 4 0.8 | .14 | 16 30.8 |
| 29 | 7 1 31.63 | .063 | 22 4 4.6 | .17 | 16 26.8 |
| 30 | 7 1 29.88 | .083 | 22 4 9.1 | .20 | 16 22.8 |
| 31 | 7 1 27.67 | 0.103 | 22 4 14.3 | 0.23 | 16 18.9 |
| 32 | 7 1 24.97 | −0.122 | +22 4 20.2 | +0.26 | 16 14.9 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 8.6 | 8.8 | 9.0 | 9.1 |
| Horizontal Parallax | 0.9 | 1.0 | 1.0 | 1.0 |

## NOVEMBER.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 7 1 24.97 | −0.122 | +22 4 20.2 | +0.26 | 16 14.9 |
| 2 | 7 1 21.79 | .143 | 22 4 26.9 | .30 | 16 10.9 |
| 3 | 7 1 18.12 | .163 | 22 4 34.4 | .33 | 16 6.9 |
| 4 | 7 1 13.98 | .183 | 22 4 42.6 | .36 | 16 2.9 |
| 5 | 7 1 9.37 | .203 | 22 4 51.5 | .38 | 15 58.9 |
| 6 | 7 1 4.26 | 0.222 | 22 5 1.1 | 0.41 | 15 54.9 |
| 7 | 7 0 58.70 | .242 | 22 5 11.4 | .45 | 15 50.8 |
| 8 | 7 0 52.66 | .261 | 22 5 22.5 | .48 | 15 46.8 |
| 9 | 7 0 46.17 | .280 | 22 5 34.3 | .51 | 15 42.7 |
| 10 | 7 0 39.23 | .300 | 22 5 46.8 | .54 | 15 38.7 |
| 11 | 7 0 31.86 | 0.319 | 22 6 0.1 | 0.57 | 15 34.6 |
| 12 | 7 0 23.94 | .338 | 22 6 14.1 | .60 | 15 30.6 |
| 13 | 7 0 15.62 | .356 | 22 6 28.8 | .63 | 15 26.5 |
| 14 | 7 0 6.86 | .374 | 22 6 44.1 | .65 | 15 22.4 |
| 15 | 6 59 57.66 | .393 | 22 7 0.0 | .68 | 15 18.3 |
| 16 | 6 59 48.02 | 0.411 | 22 7 16.6 | 0.70 | 15 14.2 |
| 17 | 6 59 37.94 | .429 | 22 7 33.8 | .73 | 15 10.1 |
| 18 | 6 59 27.42 | .447 | 22 7 51.7 | .76 | 15 6.0 |
| 19 | 6 59 16.47 | .465 | 22 8 10.2 | .78 | 15 1.9 |
| 20 | 6 59 5.10 | .483 | 22 8 29.3 | .81 | 14 57.8 |
| 21 | 6 58 53.30 | 0.500 | 22 8 49.1 | 0.84 | 14 53.6 |
| 22 | 6 58 41.09 | .518 | 22 9 9.5 | .86 | 14 49.5 |
| 23 | 6 58 28.47 | .534 | 22 9 30.5 | .88 | 14 45.4 |
| 24 | 6 58 15.46 | .550 | 22 9 52.0 | .91 | 14 41.2 |
| 25 | 6 58 2.07 | .566 | 22 10 14.0 | .93 | 14 37.0 |
| 26 | 6 57 48.28 | 0.582 | 22 10 36.5 | 0.95 | 14 32.9 |
| 27 | 6 57 34.10 | .598 | 22 10 59.5 | 0.97 | 14 28.7 |
| 28 | 6 57 19.53 | .614 | 22 11 23.1 | 1.00 | 14 24.5 |
| 29 | 6 57 4.62 | .629 | 22 11 47.3 | .01 | 14 20.4 |
| 30 | 6 56 49.37 | .644 | 22 12 11.8 | .03 | 14 16.2 |
| 31 | 6 56 33.76 | 0.658 | 22 12 36.8 | 1.05 | 14 12.0 |
| 32 | 6 56 17.79 | −0.672 | +22 13 2.3 | +1.07 | 14 7.8 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 9.1 | 9.3 | 9.4 | 9.6 |
| Horizontal Parallax | 1.0 | 1.0 | 1.0 | 1.0 |

## DECEMBER.

GREENWICH MEAN TIME.

| Day of the Month. | Apparent Right Ascension. Noon. | Var. of R.A. for 1 hour. Noon. | Apparent Declination. Noon. | Var. of Dec. for 1 hour. Noon. | Meridian Passage. |
|---|---|---|---|---|---|
| | h. m. s. | s. | ° ′ ″ | ″ | h. m. |
| 1 | 6 56 33.76 | −0.658 | +22 12 36.8 | +1.05 | 14 12.0 |
| 2 | 6 56 17.79 | .672 | 22 13 2.3 | .07 | 14 7.8 |
| 3 | 6 56 1.48 | .686 | 22 13 28.2 | .09 | 14 3.6 |
| 4 | 6 55 44.88 | .699 | 22 13 54.5 | .10 | 13 59.4 |
| 5 | 6 55 27.99 | .712 | 22 14 21.2 | .12 | 13 55.2 |
| 6 | 6 55 10.76 | 0.725 | 22 14 48.3 | 1.14 | 13 50.9 |
| 7 | 6 54 53.23 | .738 | 22 15 15.8 | .15 | 13 46.7 |
| 8 | 6 54 35.40 | .749 | 22 15 43.6 | .16 | 13 42.5 |
| 9 | 6 54 17.33 | .759 | 22 16 11.7 | .18 | 13 38.2 |
| 10 | 6 53 58.99 | .770 | 22 16 40.1 | .18 | 13 34.0 |
| 11 | 6 53 40.39 | 0.780 | 22 17 8.6 | 1.19 | 13 29.8 |
| 12 | 6 53 21.55 | .790 | 22 17 37.4 | .20 | 13 25.5 |
| 13 | 6 53 2.47 | .800 | 22 18 6.5 | .21 | 13 21.3 |
| 14 | 6 52 43.16 | .809 | 22 18 35.8 | .22 | 13 17.0 |
| 15 | 6 52 23.65 | .818 | 22 19 5.3 | .23 | 13 12.8 |
| 16 | 6 52 3.93 | 0.826 | 22 19 35.1 | 1.24 | 13 8.5 |
| 17 | 6 51 44.03 | .834 | 22 20 5.2 | .25 | 13 4.2 |
| 18 | 6 51 23.93 | .842 | 22 20 35.3 | .26 | 13 0.0 |
| 19 | 6 51 3.66 | .848 | 22 21 5.5 | .26 | 12 55.7 |
| 20 | 6 50 43.24 | .854 | 22 21 35.8 | .26 | 12 51.4 |
| 21 | 6 50 22.67 | 0.860 | 22 22 6.2 | 1.27 | 12 47.2 |
| 22 | 6 50 1.95 | .866 | 22 22 36.7 | .28 | 12 42.9 |
| 23 | 6 49 41.11 | .870 | 22 23 7.3 | .28 | 12 38.6 |
| 24 | 6 49 20.18 | .874 | 22 23 37.9 | .28 | 12 34.3 |
| 25 | 6 48 59.15 | .879 | 22 24 8.5 | .28 | 12 30.0 |
| 26 | 6 48 38.02 | 0.883 | 22 24 39.1 | 1.28 | 12 25.8 |
| 27 | 6 48 16.80 | .886 | 22 25 9.6 | .28 | 12 21.5 |
| 28 | 6 47 55.52 | .888 | 22 25 40.1 | .28 | 12 17.2 |
| 29 | 6 47 34.20 | .889 | 22 26 10.7 | .28 | 12 12.9 |
| 30 | 6 47 12.85 | .890 | 22 26 41.4 | .28 | 12 8.6 |
| 31 | 6 46 51.50 | 0.890 | 22 27 12.1 | 1.28 | 12 4.3 |
| 32 | 6 46 30.12 | −0.890 | +22 27 42.8 | +1.28 | 12 0.0 |

| Day of the Month, | 1st. | 11th. | 21st. | 31st. |
|---|---|---|---|---|
| | ″ | ″ | ″ | ″ |
| Polar Semidiameter | 9.6 | 9.6 | 9.7 | 9.7 |
| Horizontal Parallax | 1.0 | 1.1 | 1.1 | 1.1 |

| Greenwich Mean Noon. | d. | X. | Y. | Z. | Greenwich Mean Noon. | d. | X. | Y. | Z. |
|---|---|---|---|---|---|---|---|---|---|
| Jan. 0 | 0 | +.1591036 | —.8900667 | —.3862706 | Mar. 1 | 61 | +.9383434 | —.2939670 | —.1275814 |
| 1 | 1 | .1763431 | .8873308 | .3850838 | 2 | 62 | .9440514 | .2789363 | .1210586 |
| 2 | 2 | .1935286 | .8843181 | .3837769 | 3 | 63 | 9494724 | .2638195 | .1144983 |
| 3 | 3 | .2106554 | .8810287 | .3823501 | 4 | 64 | .9546050 | .2486221 | .1079027 |
| 4 | 4 | .2277179 | .8774638 | .3808037 | 5 | 65 | .9594474 | .2333486 | .1012740 |
| 5 | 5 | .2447101 | .8736246 | .3791380 | 6 | 66 | .9639979 | .2180042 | .0946143 |
| 6 | 6 | .2616269 | .8695119 | .3773535 | 7 | 67 | .9682557 | .2025932 | .0879256 |
| 7 | 7 | .2784619 | .8651274 | .3754509 | 8 | 68 | .9722190 | .1871204 | .0812101 |
| 8 | 8 | .2952090 | .8604726 | .3734310 | 9 | 69 | .9758871 | .1715916 | .0744701 |
| 9 | 9 | .3118640 | .8555486 | .3712943 | 10 | 70 | .9792597 | .1560111 | .0677078 |
| 10 | 10 | .3284209 | .8503570 | .3690413 | 11 | 71 | .9823357 | .1403852 | .0609256 |
| 11 | 11 | .3448737 | .8449004 | .3666728 | 12 | 72 | .9851146 | .1247184 | .0541257 |
| 12 | 12 | .3612178 | .8391802 | .3641899 | 13 | 73 | .9875962 | .1090147 | .0473101 |
| 13 | 13 | .3774477 | .8331984 | .3615936 | 14 | 74 | .9897805 | .0932793 | .0404808 |
| 14 | 14 | .3935588 | .8269580 | .3588849 | 15 | 75 | .9916680 | .0775179 | .0336401 |
| 15 | 15 | .4095465 | .8204610 | .3560648 | 16 | 76 | .9932577 | .0617346 | .0267901 |
| 16 | 16 | .4254050 | .8137097 | .3531343 | 17 | 77 | .9945503 | .0459338 | .0199329 |
| 17 | 17 | .4411302 | .8067063 | .3500944 | 18 | 78 | .9955460 | .0301206 | .0130704 |
| 18 | 18 | .4567175 | .7994533 | .3469463 | 19 | 79 | .9962446 | —.0142993 | —.0062045 |
| 19 | 19 | .4721623 | .7919535 | .3436911 | 20 | 80 | .9966468 | +.0015253 | +.0006628 |
| 20 | 20 | .4874602 | .7842089 | .3403299 | 21 | 81 | .9967526 | .0173486 | .0075295 |
| 21 | 21 | .5026070 | .7762222 | .3368638 | 22 | 82 | .9965623 | .0331676 | .0143939 |
| 22 | 22 | .5175980 | .7679963 | .3332938 | 23 | 83 | .9960766 | .0489775 | .0212543 |
| 23 | 23 | .5324301 | .7595334 | .3296210 | 24 | 84 | .9952952 | .0647732 | .0281087 |
| 24 | 24 | .5470978 | .7508357 | .3258466 | 25 | 85 | .9942186 | .0805500 | .0349551 |
| 25 | 25 | .5615973 | .7419055 | .3219717 | 26 | 86 | .9928471 | .0963037 | .0417915 |
| 26 | 26 | .5759240 | .7327456 | .3179973 | 27 | 87 | .9911811 | .1120310 | .0486163 |
| 27 | 27 | .5900738 | .7233586 | .3139243 | 28 | 88 | .9892207 | .1277268 | .0554276 |
| 28 | 28 | .6040429 | .7137474 | .3097540 | 29 | 89 | .9869662 | .1433855 | .0622232 |
| 29 | 29 | .6178263 | .7039149 | .3054877 | 30 | 90 | .9844189 | .1590030 | .0690009 |
| 30 | 30 | .6314196 | .6938640 | .3011265 | 31 | 91 | .9815792 | .1745743 | .0757589 |
| 31 | 31 | .6448183 | .6835974 | .2966716 | Apr. 1 | 92 | .9784477 | .1900958 | .0824952 |
| Feb. 1 | 32 | .6580189 | .6731180 | .2921244 | 2 | 93 | .9750253 | .2055617 | .0892076 |
| 2 | 33 | .6710163 | .6624289 | .2874862 | 3 | 94 | .9713132 | .2209672 | .0958939 |
| 3 | 34 | .6838067 | .6515336 | .2827583 | 4 | 95 | .9673128 | .2363080 | .1025520 |
| 4 | 35 | .6963853 | .6404357 | .2779421 | 5 | 96 | .9630256 | .2515789 | .1091799 |
| 5 | 36 | .7087485 | .6291388 | .2730394 | 6 | 97 | .9584529 | .2667744 | .1157755 |
| 6 | 37 | .7208915 | .6176467 | .2680520 | 7 | 98 | .9535965 | .2818911 | .1223366 |
| 7 | 38 | .7328112 | .6059636 | .2629815 | 8 | 99 | .9484581 | .2969240 | .1288612 |
| 8 | 39 | .7445038 | .5940933 | .2578297 | 9 | 100 | .9430395 | .3118677 | .1353472 |
| 9 | 40 | .7559655 | .5820396 | .2525982 | 10 | 101 | .9373441 | .3267180 | .1417924 |
| 10 | 41 | .7671928 | .5698066 | .2472887 | 11 | 102 | .9313735 | .3414712 | .1481954 |
| 11 | 42 | .7781823 | .5573986 | .2419031 | 12 | 103 | .9251298 | .3561232 | .1545543 |
| 12 | 43 | .7889314 | .5448199 | .2364434 | 13 | 104 | .9186156 | .3706692 | .1608671 |
| 13 | 44 | .7994369 | .5320747 | .2309116 | 14 | 105 | .9118336 | .3851057 | .1671321 |
| 14 | 45 | .8096959 | .5191672 | .2253095 | 15 | 106 | .9047858 | .3994284 | .1733476 |
| 15 | 46 | .8197056 | .5061019 | .2196389 | 16 | 107 | .8974746 | .4136340 | .1795123 |
| 16 | 47 | .8294634 | .4928828 | .2139017 | 17 | 108 | .8899032 | .4277185 | .1856241 |
| 17 | 48 | .8389670 | .4795140 | .2080997 | 18 | 109 | .8820740 | .4416783 | .1916817 |
| 18 | 49 | .8482140 | .4660001 | .2022348 | 19 | 110 | .8739887 | .4555090 | .1976835 |
| 19 | 50 | .8572020 | .4523449 | .1963087 | 20 | 111 | .8656505 | .4692086 | .2036279 |
| 20 | 51 | .8659285 | .4385519 | .1903231 | 21 | 112 | .8570617 | .4827720 | .2095136 |
| 21 | 52 | .8743919 | .4246255 | .1842797 | 22 | 113 | .8482247 | .4961955 | .2153386 |
| 22 | 53 | .8825899 | .4105699 | .1781803 | 23 | 114 | .8391419 | .5094763 | .2211016 |
| 23 | 54 | .8905200 | .3963891 | .1720267 | 24 | 115 | .8298159 | .5226105 | .2268013 |
| 24 | 55 | .8981798 | .3820869 | .1658206 | 25 | 116 | .8202494 | .5355945 | .2324360 |
| 25 | 56 | .9055672 | .3676675 | .1595637 | 26 | 117 | .8104444 | .5484252 | .2380042 |
| 26 | 57 | .9126803 | .3531357 | .1532578 | 27 | 118 | .8004036 | .5610985 | .2435040 |
| 27 | 58 | .9195163 | .3384956 | .1469048 | 28 | 119 | .7901301 | .5736100 | .2489340 |
| 28 | 59 | .9260733 | .3237513 | .1405065 | 29 | 120 | .7796270 | .5859562 | .2542924 |
| 29 | 60 | +.9323501 | —.3089069 | —.1340647 | 30 | 121 | +.7688971 | +.5981337 | +.2595777 |

| Greenwich Mean Noon. | | X. | Y. | Z. | Greenwich Mean Noon. | | X. | Y. | Z. |
|---|---|---|---|---|---|---|---|---|---|
| | d. | | | | | d | | | |
| May 1 | 122 | +.7579433 | +.6101388 | +.2647884 | July 1 | 183 | —.1722775 | +.9192894 | +.3989573 |
| 2 | 123 | .7467689 | .6219679 | .2699226 | 2 | 184 | .1889324 | .9165342 | .3977619 |
| 3 | 124 | .7353775 | .6336173 | .2749790 | 3 | 185 | .2055333 | .9135191 | .3964535 |
| 4 | 125 | .7237729 | .6450835 | .2799558 | 4 | 186 | .2220763 | .9102460 | .3950329 |
| 5 | 126 | .7119590 | .6563634 | .2848516 | 5 | 187 | .2385561 | .9067152 | .3935005 |
| 6 | 127 | .6999395 | .6674526 | .2896648 | 6 | 188 | .2549671 | .9029284 | .3918568 |
| 7 | 128 | .6877182 | .6783485 | .2943937 | 7 | 189 | .2713049 | .8988867 | .3901024 |
| 8 | 129 | .6752985 | .6890477 | .2990374 | 8 | 190 | .2875646 | .8945913 | .3882378 |
| 9 | 130 | .6626847 | .6995475 | .3035944 | 9 | 191 | .3037421 | .8900438 | .3862636 |
| 10 | 131 | .6498811 | .7098455 | .3080635 | 10 | 192 | .3198322 | .8852460 | .3841808 |
| 11 | 132 | .6368921 | .7199389 | .3124438 | 11 | 193 | .3358306 | .8801995 | .3819901 |
| 12 | 133 | .6237218 | .7298249 | .3167339 | 12 | 194 | .3517336 | .8749057 | .3796921 |
| 13 | 134 | .6103739 | .7395011 | .3209326 | 13 | 195 | .3675364 | .8693661 | .3772876 |
| 14 | 135 | .5968533 | .7489651 | .3250392 | 14 | 196 | .3832345 | .8635832 | .3747775 |
| 15 | 136 | .5831636 | .7582144 | .3290525 | 15 | 197 | .3988239 | 8575587 | .3721627 |
| 16 | 137 | .5693085 | .7672473 | .3329718 | 16 | 198 | .4143002 | .8512941 | .3694438 |
| 17 | 138 | .5552924 | .7760615 | .3367963 | 17 | 199 | .4296608 | .8447908 | .3666215 |
| 18 | 139 | .5411192 | .7846550 | .3405249 | 18 | 200 | .4449012 | .8380504 | .3636964 |
| 19 | 140 | .5267927 | .7930254 | .3441567 | 19 | 201 | .4600170 | .8310746 | .3606694 |
| 20 | 141 | .5123172 | .8011705 | .3476910 | 20 | 202 | .4750043 | .8238653 | .3575412 |
| 21 | 142 | .4976958 | .8090885 | 3511271 | 21 | 203 | .4898588 | .8164244 | .3543125 |
| 22 | 143 | .4829328 | .8167778 | .3544640 | 22 | 204 | .5045763 | .8087534 | .3509843 |
| 23 | 144 | .4680319 | .8242362 | .3577005 | 23 | 205 | .5191527 | .8008539 | .3475568 |
| 24 | 145 | .4529971 | .8314613 | .3608360 | 24 | 206 | .5335852 | .7927278 | .3440310 |
| 25 | 146 | .4378324 | .8384513 | .3638697 | 25 | 207 | .5478685 | .7843771 | .3404077 |
| 26 | 147 | .4225425 | .8452040 | .3668005 | 26 | 208 | .5619982 | .7758038 | .3366879 |
| 27 | 148 | .4071311 | .8517171 | .3696275 | 27 | 209 | .5759693 | .7670099 | .3328721 |
| 28 | 149 | .3916024 | .8579883 | .3723497 | 28 | 210 | .5897787 | .7579977 | .3289615 |
| 29 | 150 | .3759610 | .8640159 | .3749662 | 29 | 211 | .6034217 | .7487696 | .3249570 |
| 30 | 151 | .3602112 | .8697984 | .3774763 | 30 | 212 | .6168937 | .7393284 | .3208600 |
| 31 | 152 | .3443578 | .8753335 | .3798792 | 31 | 213 | .6301903 | .7296771 | .3166717 |
| June 1 | 153 | .3284053 | .8806197 | .3821739 | Aug. 1 | 214 | .6433078 | .7198181 | .3123928 |
| 2 | 154 | .3123585 | .8856554 | .3843598 | 2 | 215 | .6562423 | .7097536 | .3080247 |
| 3 | 155 | .2962223 | .8904388 | .3864361 | 3 | 216 | .6689898 | .6994865 | .3035685 |
| 4 | 156 | .2800023 | .8949689 | .3884025 | 4 | 217 | .6815461 | .6890211 | .2990261 |
| 5 | 157 | .2637029 | .8992444 | .3902581 | 5 | 218 | .6939069 | .6783599 | .2943988 |
| 6 | 158 | .2473292 | .9032636 | .3920024 | 6 | 219 | .7060688 | .6675058 | .2896877 |
| 7 | 159 | .2308863 | .9070264 | .3936353 | 7 | 220 | .7180292 | .6564634 | .2848947 |
| 8 | 160 | .2143794 | .9105315 | .3951562 | 8 | 221 | .7297839 | .6452353 | .2800214 |
| 9 | 161 | .1978133 | .9137782 | .3965645 | 9 | 222 | .7413304 | .6338244 | .2750688 |
| 10 | 162 | .1811921 | .9167658 | .3978607 | 10 | 223 | .7526655 | .6222342 | .2700384 |
| 11 | 163 | .1645215 | .9194943 | .3990442 | 11 | 224 | .7637848 | .6104685 | .2649321 |
| 12 | 164 | .1478059 | .9219636 | .4001151 | 12 | 225 | .7746870 | .5985307 | .2597512 |
| 13 | 165 | .1310501 | .9241728 | .4010732 | 13 | 226 | .7853687 | .5864240 | .2544971 |
| 14 | 166 | .1142587 | .9261218 | .4019184 | 14 | 227 | .7958271 | .5741511 | .2491710 |
| 15 | 167 | .0974366 | .9278105 | .4026508 | 15 | 228 | .8060595 | .5617163 | .2437748 |
| 16 | 168 | .0805884 | .9292391 | .4032702 | 16 | 229 | .8160633 | .5491229 | .2383099 |
| 17 | 169 | .0637180 | .9304066 | .4037764 | 17 | 230 | .8258357 | .5363731 | .2327772 |
| 18 | 170 | .0468305 | .9313135 | .4041696 | 18 | 231 | .8353730 | .5234706 | .2271785 |
| 19 | 171 | .0299290 | .9319590 | .4044496 | 19 | 232 | .8446735 | .5104179 | .2215148 |
| 20 | 172 | +.0130183 | .9323431 | .4046163 | 20 | 233 | .8537340 | .4972191 | .2157873 |
| 21 | 173 | —.0038966 | .9324655 | .4046696 | 21 | 234 | .8625522 | .4838776 | .2099980 |
| 22 | 174 | .0208116 | .9323266 | .4046097 | 22 | 235 | .8711241 | .4703968 | .2041482 |
| 23 | 175 | .0377224 | .9319259 | .4044361 | 23 | 236 | .8794483 | .4567804 | .1982395 |
| 24 | 176 | .0546237 | .9312634 | .4041491 | 24 | 237 | .8875213 | .4430315 | .1922731 |
| 25 | 177 | .0715111 | .9303382 | .4037483 | 25 | 238 | .8953395 | .4291544 | .1862510 |
| 26 | 178 | .0883802 | .9291513 | .4032340 | 26 | 239 | .9029009 | .4151524 | .1801746 |
| 27 | 179 | .1052260 | .9277020 | .4026058 | 27 | 240 | .9102030 | .4010296 | .1740454 |
| 28 | 180 | .1220435 | .9259909 | .4018636 | 28 | 241 | .9172424 | .3867903 | .1678655 |
| 29 | 181 | .1388278 | .9240180 | .4010083 | 29 | 242 | .9240173 | .3724384 | .1616368 |
| 30 | 182 | —.1555742 | +.9217842 | +.4000395 | 30 | 243 | —.9305252 | +.3579781 | +.1558609 |

# SUN'S COÖRDINATES, 1856.

| Greenwich Mean Noon. | | X. | Y. | Z. | Greenwich Mean Noon. | | X. | Y. | Z. |
|---|---|---|---|---|---|---|---|---|---|
| | d | | | | | d. | | | |
| Aug. 31 | 244 | —.9367632 | +.3434147 | +.1490399 | Nov. 1 | 306 | —.7675641 | —.5760844 | —.2500150 |
| Sept. 1 | 245 | .9427293 | .3287517 | .1426757 | 2 | 307 | .7562628 | .5881640 | .2552574 |
| 2 | 246 | .9484222 | .3139937 | .1362701 | 3 | 308 | .7447317 | .6000637 | .2604216 |
| 3 | 247 | .9538398 | .2991454 | .1298255 | 4 | 309 | .7329752 | .6117795 | .2655058 |
| 4 | 248 | .9589803 | .2842119 | .1233437 | 5 | 310 | .7209968 | .6233081 | .2705087 |
| 5 | 249 | .9638418 | .2691967 | .1168266 | 6 | 311 | .7088003 | .6346460 | .2754288 |
| 6 | 250 | .9684238 | .2541039 | .1102762 | 7 | 312 | .6963891 | .6457894 | .2802643 |
| 7 | 251 | .9727247 | .2389392 | .1036947 | 8 | 313 | .6837670 | .6567357 | .2850141 |
| 8 | 252 | .9767430 | .2237076 | .0970841 | 9 | 314 | .6709381 | .6674822 | .2896770 |
| 9 | 253 | .9804780 | .2084122 | .0904460 | 10 | 315 | .6579062 | .6780253 | .2942516 |
| 10 | 254 | .9839291 | .1930580 | .0837825 | 11 | 316 | .6446750 | .6883612 | .2987367 |
| 11 | 255 | .9870952 | .1776490 | .0770954 | 12 | 317 | .6312484 | .6984881 | .3031309 |
| 12 | 256 | .9899755 | .1621892 | .0703863 | 13 | 318 | .6176295 | .7084015 | .3074327 |
| 13 | 257 | .9925688 | .1466832 | .0636574 | 14 | 319 | .6038220 | .7180998 | .3116411 |
| 14 | 258 | .9948746 | .1311349 | .0569103 | 15 | 320 | .5898299 | .7275795 | .3157548 |
| 15 | 259 | .9968920 | .1155486 | .0501467 | 16 | 321 | .5756576 | .7368380 | .3197727 |
| 16 | 260 | .9986204 | .0999282 | .0433685 | 17 | 322 | .5613082 | .7458722 | .3236934 |
| 17 | 261 | 1.0000591 | .0842785 | .0365775 | 18 | 323 | .5467856 | .7546788 | .3275155 |
| 18 | 262 | 1.0012066 | .0686040 | .0297754 | 19 | 324 | .5320938 | .7632550 | .3312376 |
| 19 | 263 | 1.0020627 | .0529079 | .0229640 | 20 | 325 | .5172376 | .7715976 | .3348585 |
| 20 | 264 | 1.0026265 | .0371952 | 0161452 | 21 | 326 | .5022215 | .7797037 | .3383769 |
| 21 | 265 | 1.0028972 | .0214703 | .0093211 | 22 | 327 | .4870498 | .7875697 | .3417914 |
| 22 | 266 | 1.0028744 | +.0057378 | +.0024936 | 23 | 328 | .4717261 | .7951938 | .3451007 |
| 23 | 267 | 1.0025571 | —.0099982 | —.0043355 | 24 | 329 | .4562555 | .8025727 | .3483035 |
| 24 | 268 | 1.0019449 | .0257325 | .0111642 | 25 | 330 | .4406426 | .8097035 | .3513987 |
| 25 | 269 | 1.0010374 | .0414603 | .0179903 | 26 | 331 | .4248929 | .8165837 | .3543853 |
| 26 | 270 | .9998340 | .0571768 | .0248114 | 27 | 332 | .4090113 | .8232111 | .3572619 |
| 27 | 271 | .9983354 | .0728774 | .0316257 | 28 | 333 | .3930032 | .8295826 | .3600274 |
| 28 | 272 | .9965410 | .0885572 | .0384313 | 29 | 334 | .3768730 | .8356970 | .3626810 |
| 29 | 273 | .9944507 | .1042107 | .0452253 | 30 | 335 | .3606265 | .8415522 | .3652220 |
| 30 | 274 | .9920658 | .1198328 | .0520059 | Dec. 1 | 336 | .3442688 | .8471460 | .3676497 |
| Oct. 1 | 275 | .9893866 | .1354190 | .0587708 | 2 | 337 | .3278052 | .8524771 | .3699629 |
| 2 | 276 | .9864128 | .1509653 | .0655184 | 3 | 338 | .3112419 | .8575428 | .3721609 |
| 3 | 277 | .9831464 | .1664660 | .0722459 | 4 | 339 | .2945837 | .8623424 | .3742432 |
| 4 | 278 | .9795884 | .1819159 | .0789516 | 5 | 340 | .2778356 | .8668744 | .3762093 |
| 5 | 279 | .9757390 | .1973103 | .0856328 | 6 | 341 | .2610029 | .8711379 | .3780589 |
| 6 | 280 | .9716004 | .2126441 | .0922877 | 7 | 342 | .2440911 | .8751320 | .3797914 |
| 7 | 281 | .9671734 | .2279139 | .0989146 | 8 | 343 | .2271055 | .8788546 | .3814064 |
| 8 | 282 | .9624595 | .2431149 | .1055113 | 9 | 344 | .2100508 | .8823060 | .3829035 |
| 9 | 283 | .9574604 | .2582422 | .1120762 | 10 | 345 | .1929315 | .8854848 | .3842824 |
| 10 | 284 | .9521774 | .2732914 | .1186069 | 11 | 346 | .1757533 | .8883905 | .3855428 |
| 11 | 285 | .9466124 | .2882585 | .1251018 | 12 | 347 | .1585213 | .8910211 | .3866842 |
| 12 | 286 | .9407666 | .3031395 | .1315591 | 13 | 348 | .1412407 | .8933765 | .3877064 |
| 13 | 287 | .9346411 | .3179306 | .1379775 | 14 | 349 | .1239152 | .8954562 | .3886090 |
| 14 | 288 | .9282384 | .3326271 | .1443549 | 15 | 350 | .1065509 | .8972592 | .3893915 |
| 15 | 289 | .9215597 | .3472241 | .1506892 | 16 | 351 | .0891534 | .8987841 | .3900538 |
| 16 | 290 | .9146067 | .3617178 | .1569787 | 17 | 352 | .0717266 | .9000309 | .3905952 |
| 17 | 291 | .9073805 | .3761040 | .1632218 | 18 | 353 | .0542756 | .9009983 | .3910156 |
| 18 | 292 | .8998829 | .3903793 | .1694166 | 19 | 354 | .0368062 | .9016865 | .3913150 |
| 19 | 293 | .8921159 | .4045388 | .1755614 | 20 | 355 | .0193235 | .9020942 | .3914927 |
| 20 | 294 | .8840814 | .4185779 | .1816540 | 21 | 356 | —.0018333 | .9022212 | .3915485 |
| 21 | 295 | .8757806 | .4324927 | .1876929 | 22 | 357 | +.0156590 | .9020673 | .3914823 |
| 22 | 296 | .8672156 | .4462791 | .1936764 | 23 | 358 | .0331474 | .9016312 | .3912937 |
| 23 | 297 | .8583886 | .4599326 | .1996023 | 24 | 359 | .0506269 | .9009138 | .3909828 |
| 24 | 298 | .8493014 | .4734484 | .2054683 | 25 | 360 | .0680907 | .8999150 | .3905497 |
| 25 | 299 | .8399563 | .4868221 | .2112727 | 26 | 361 | .0855341 | .8986347 | .3899941 |
| 26 | 300 | .8303564 | .5000489 | .2170135 | 27 | 362 | .1029506 | .8970729 | .3893164 |
| 27 | 301 | .8205045 | .5131240 | .2226887 | 28 | 363 | .1203352 | .8952307 | .3885170 |
| 28 | 302 | .8104030 | .5260440 | .2282964 | 29 | 364 | .1376815 | .8931084 | .3875957 |
| 29 | 303 | .8000546 | .5388047 | .2338348 | 30 | 365 | .1549844 | .8907071 | .3865532 |
| 30 | 304 | .7894633 | .5514011 | .2393020 | 31 | 366 | .1722373 | .8880277 | .3853897 |
| 31 | 305 | —.7786319 | —.5638290 | —.2446960 | 32 | 367 | +.1894350 | —.8850712 | —.3841061 |

# ASTRONOMICAL EPHEMERIS

FOR THE

# MERIDIAN OF WASHINGTON.

| Sidereal 0h. | Apparent Obliquity. | Equation of Equinoxes. |  | Precession of Equinoxes in Longitude. | The Sun's |  | Mean Longitude of Moon's Ascending Node. |
|---|---|---|---|---|---|---|---|
|  |  | In Longitude. | In R. A. |  | Aberration. | Hor. Parallax. |  |
| 1856. | 23° 27′ |  |  |  |  |  |  |
| 0 | 35″.61 | -8″.06 | -0s.48 | 0″.00 | -20″.80 | 8″.72 | 30° 11′.1 |
| 10 | 35.74 | 7.50 | 0.45 | 1.37 | 20.79 | 8.72 | 29 39.4 |
| 20 | 35.92 | 7.05 | 0.42 | 2.74 | 20.77 | 8.71 | 29 7.7 |
| 30 | 36.13 | 6.74 | 0.41 | 4.12 | 20.75 | 8.70 | 28 36.0 |
| 40 | 36.35 | 6.59 | 0.40 | 5.49 | 20.72 | 8.69 | 28 4.3 |
| 50 | 36.56 | 6.59 | 0.40 | 6.86 | 20.67 | 8.67 | 27 32.6 |
| 60 | 36.73 | 6.73 | 0.41 | 8.23 | 20.62 | 8.65 | 27 1.0 |
| 70 | 36.85 | 6.97 | 0.42 | 9.60 | 20.57 | 8.63 | 26 29.3 |
| 80 | 36.90 | 7.26 | 0.44 | 10.98 | 20.51 | 8.61 | 25 57.6 |
| 90 | 36.89 | 7.54 | 0.45 | 12.35 | 20.45 | 8.58 | 25 25.9 |
| 100 | 36.82 | 7.78 | 0.47 | 13.72 | 20.40 | 8.56 | 24 54.2 |
| 110 | 36.70 | 7.92 | 0.48 | 15.09 | 20.34 | 8.53 | 24 22.5 |
| 120 | 36.55 | 7.94 | 0.48 | 16.47 | 20.29 | 8.51 | 23 50.8 |
| 130 | 36.39 | 7.82 | 0.47 | 17.84 | 20.24 | 8.49 | 23 19.2 |
| 140 | 36.23 | 7.56 | 0.45 | 19.21 | 20.19 | 8.47 | 22 47.5 |
| 150 | 36.11 | 7.19 | 0.43 | 20.59 | 20.16 | 8.46 | 22 15.8 |
| 160 | 36.02 | 6.72 | 0.40 | 21.95 | 20.13 | 8.45 | 21 44.1 |
| 170 | 35.99 | 6.19 | 0.37 | 23.33 | 20.12 | 8.44 | 21 12.4 |
| 180 | 36.02 | 5.66 | 0.34 | 24.70 | 20.11 | 8.44 | 20 40.7 |
| 190 | 36.11 | 5.15 | 0.31 | 26.07 | 20.11 | 8.44 | 20 9.0 |
| 200 | 36.24 | 4.72 | 0.28 | 27.44 | 20.12 | 8.44 | 19 37.4 |
| 210 | 36.42 | 4.39 | 0.26 | 28.81 | 20.14 | 8.45 | 19 5.7 |
| 220 | 36.61 | 4.19 | 0.25 | 30.19 | 20.17 | 8.46 | 18 34.0 |
| 230 | 36.80 | 4.13 | 0.25 | 31.56 | 20.21 | 8.48 | 18 2.3 |
| 240 | 36.97 | 4.20 | 0.25 | 32.93 | 20.25 | 8.50 | 17 30.6 |
| 250 | 37.11 | 4.37 | 0.26 | 34.31 | 20.30 | 8.52 | 16 58.9 |
| 260 | 37.19 | 4.62 | 0.28 | 35.68 | 20.35 | 8.54 | 16 27.2 |
| 270 | 37.21 | 4.91 | 0.29 | 37.05 | 20.41 | 8.57 | 15 55.6 |
| 280 | 37.16 | 5.17 | 0.31 | 38.42 | 20.47 | 8.59 | 15 23.9 |
| 290 | 37.06 | 5.37 | 0.32 | 39.79 | 20.53 | 8.61 | 14 52.2 |
| 300 | 36.91 | 5.46 | 0.33 | 41.16 | 20.59 | 8.64 | 14 20.5 |
| 310 | 36.73 | 5.41 | 0.32 | 42.54 | 20.64 | 8.66 | 13 48.8 |
| 320 | 36.55 | 5.20 | 0.31 | 43.91 | 20.68 | 8.68 | 13 17.1 |
| 330 | 36.38 | 4.83 | 0.29 | 45.28 | 20.73 | 8.70 | 12 45.4 |
| 340 | 36.25 | 4.34 | 0.26 | 46.65 | 20.76 | 8.71 | 12 13.8 |
| 350 | 36.17 | 3.75 | 0.22 | 48.02 | 20.78 | 8.71 | 11 42.1 |
| 360 | 36.16 | 3.12 | 0.19 | 49.40 | 20.79 | 8.72 | 11 10.4 |
| 370 | 36.22 | -2.52 | -0.15 | 50.77 | -20.79 | 8.72 | 10 38.7 |

| | | |
|---|---|---|
| Mean Obliquity, 1856.0, . . . . . . . . | 23° 27′ 28″.21 | Daily Motion. |
| Precession for 1856.5, . . . . . . . . . | 50.2539 | 3′.169 |
| Log. Precession in a Sidereal Day, . . . . | 9.13739 | |
| Log. Precession in a Solar Day, . . . . . | 9.13858 | |

## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

| Date. | A. | B. | C. | D. | Date. | A. | B. | C. | D. |
|---|---|---|---|---|---|---|---|---|---|
| Jan. 1 | −0.55582 | +1.30246 | −9.19703 | −0.87000 | Mar. 1 | −1.25099 | +0.80390 | +8.50024 | −0.93497 |
| 2 | 0.59362 | 1.30088 | 9.18614 | 0.87069 | 2 | 1.25340 | 0.78003 | 8.53110 | 0.93574 |
| 3 | 0.62805 | 1.29915 | 9.17502 | 0.87141 | 3 | 1.25567 | 0.75465 | 8.55967 | 0.93647 |
| 4 | 0.66023 | 1.29728 | 9.16369 | 0.87217 | 4 | 1.25779 | 0.72755 | 8.58625 | 0.93717 |
| 5 | 0.69000 | 1.29526 | 9.15207 | 0.87295 | 5 | 1.25977 | 0.69852 | 8.61109 | 0.93784 |
| 6 | −0.71758 | +1.29310 | −9.14019 | −0.87378 | 6 | −1.26161 | +0.66727 | +8.63438 | −0.93848 |
| 7 | 0.74339 | 1.29079 | 9.12804 | 0.87464 | 7 | 1.26330 | 0.63348 | 8.65639 | 0.93909 |
| 8 | 0.76763 | 1.28833 | 9.11561 | 0.87553 | 8 | 1.26487 | 0.59671 | 8.67724 | 0.93967 |
| 9 | 0.79049 | 1.28573 | 9.10288 | 0.87646 | 9 | 1.26629 | 0.55642 | 8.69705 | 0.94022 |
| 10 | 0.81199 | 1.28293 | 9.08980 | 0.87741 | 10 | 1.26757 | 0.51185 | 8.71592 | 0.94074 |
| 11 | −0.83239 | +1.28002 | −9.07639 | −0.87840 | 11 | −1.26872 | +0.46209 | +8.73392 | −0.94122 |
| 12 | 0.85174 | 1.27688 | 9.06266 | 0.87940 | 12 | 1.26973 | 0.40573 | 8.75113 | 0.94167 |
| 13 | 0.87013 | 1.27369 | 9.04856 | 0.88043 | 13 | 1.27062 | 0.34098 | 8.76760 | 0.94209 |
| 14 | 0.88764 | 1.27028 | 9.03407 | 0.88149 | 14 | 1.27137 | 0.26463 | 8.78340 | 0.94247 |
| 15 | 0.90434 | 1.26672 | 9.01920 | 0.88256 | 15 | 1.27198 | 0.17184 | 8.79865 | 0.94282 |
| 16 | −0.92029 | +1.26298 | −9.00389 | −0.88367 | 16 | −1.27246 | +0.05361 | +8.81331 | −0.94314 |
| 17 | 0.93553 | 1.25907 | 8.98811 | 0.88479 | 17 | 1.27281 | 9.89060 | 8.82750 | 0.94342 |
| 18 | 0.95013 | 1.25499 | 8.97188 | 0.88594 | 18 | 1.27304 | 9.62656 | 8.84123 | 0.94367 |
| 19 | 0.96410 | 1.25074 | 8.95516 | 0.88709 | 19 | 1.27313 | +8.84002 | 8.85455 | 0.94389 |
| 20 | 0.97752 | 1.24628 | 8.93792 | 0.88827 | 20 | 1.27309 | −9.46333 | 8.86741 | 0.94407 |
| 21 | −0.99039 | +1.24167 | −8.92007 | −0.88946 | 21 | −1.27292 | −9.80498 | +8.87990 | −0.94422 |
| 22 | 1.00277 | 1.23686 | 8.90162 | 0.89061 | 22 | 1.27262 | 9.99626 | 8.89204 | 0.94434 |
| 23 | 1.01466 | 1.23186 | 8.88252 | 0.89188 | 23 | 1.27219 | 0.12843 | 8.90385 | 0.94442 |
| 24 | 1.02610 | 1.22666 | 8.86273 | 0.89312 | 24 | 1.27163 | 0.22945 | 8.91540 | 0.94448 |
| 25 | 1.03712 | 1.22127 | 8.84217 | 0.89435 | 25 | 1.27094 | 0.31127 | 8.92670 | 0.94450 |
| 26 | −1.04772 | +1.21568 | −8.82072 | −0.89561 | 26 | −1.27012 | −0.37987 | +8.93772 | −0.94450 |
| 27 | 1.05793 | 1.20987 | 8.79844 | 0.89688 | 27 | 1.26917 | 0.43900 | 8.94851 | 0.94446 |
| 28 | 1.06774 | 1.20385 | 8.77517 | 0.89814 | 28 | 1.26810 | 0.49090 | 8.95909 | 0.94438 |
| 29 | 1.07726 | 1.19761 | 8.75082 | 0.89940 | 29 | 1.26688 | 0.53709 | 8.96946 | 0.94428 |
| 30 | 1.08639 | 1.19112 | 8.72526 | 0.90067 | 30 | 1.26554 | 0.57870 | 8.97959 | 0.94414 |
| 31 | −1.09519 | +1.18443 | −8.69836 | −0.90195 | 31 | −1.26406 | −0.61651 | +8.98954 | −0.94397 |
| Feb. 1 | 1.10370 | 1.17748 | 8.66997 | 0.90323 | Apr. 1 | 1.26245 | 0.65122 | 8.99930 | 0.94378 |
| 2 | 1.11190 | 1.17027 | 8.63998 | 0.90451 | 2 | 1.26071 | 0.68320 | 9.00890 | 0.94355 |
| 3 | 1.11983 | 1.16283 | 8.60810 | 0.90577 | 3 | 1.25884 | 0.71284 | 9.01837 | 0.94329 |
| 4 | 1.12746 | 1.15514 | 8.57403 | 0.90703 | 4 | 1.25680 | 0.74045 | 9.02768 | 0.94300 |
| 5 | −1.13485 | +1.14712 | −8.53744 | −0.90830 | 5 | −1.25466 | −0.76624 | +9.03683 | −0.94269 |
| 6 | 1.14196 | 1.13884 | 8.49803 | 0.90955 | 6 | 1.25239 | 0.79047 | 9.04587 | 0.94235 |
| 7 | 1.14882 | 1.13026 | 8.45515 | 0.91079 | 7 | 1.24995 | 0.81329 | 9.05480 | 0.94198 |
| 8 | 1.15545 | 1.12139 | 8.40807 | 0.91203 | 8 | 1.24739 | 0.83485 | 9.06363 | 0.94159 |
| 9 | 1.16185 | 1.11218 | 8.35583 | 0.91326 | 9 | 1.24467 | 0.85525 | 9.07236 | 0.94117 |
| 10 | −1.16799 | +1.10264 | −8.29710 | −0.91448 | 10 | −1.24183 | −0.87460 | +9.08099 | −0.94072 |
| 11 | 1.17393 | 1.09275 | 8.22994 | 0.91570 | 11 | 1.23882 | 0.89299 | 9.08948 | 0.94025 |
| 12 | 1.17966 | 1.08249 | 8.15137 | 0.91688 | 12 | 1.23569 | 0.91051 | 9.09788 | 0.93975 |
| 13 | 1.18515 | 1.07185 | 8.05652 | 0.91807 | 13 | 1.23238 | 0.92722 | 9.10619 | 0.93924 |
| 14 | 1.19048 | 1.06082 | 7.93702 | 0.91923 | 14 | 1.22894 | 0.94318 | 9.11444 | 0.93870 |
| 15 | −1.19559 | +1.04935 | −7.77379 | −0.92037 | 15 | −1.22535 | −0.95844 | +9.12261 | −0.93815 |
| 16 | 1.20051 | 1.03746 | 7.51188 | 0.92151 | 16 | 1.22159 | 0.97305 | 9.13072 | 0.93757 |
| 17 | 1.20524 | 1.02508 | −6.77085 | 0.92260 | 17 | 1.21767 | 0.98706 | 9.13874 | 0.93698 |
| 18 | 1.20973 | 1.01220 | +7.30963 | 0.92370 | 18 | 1.21360 | 1.00050 | 9.14669 | 0.93637 |
| 19 | 1.21413 | 0.99881 | 7.66745 | 0.92477 | 19 | 1.20936 | 1.01341 | 9.15455 | 0.93573 |
| 20 | −1.21831 | +0.98485 | +7.85914 | −0.92582 | 20 | −1.20496 | −1.02583 | +9.16233 | −0.93508 |
| 21 | 1.22231 | 0.97030 | 7.99034 | 0.92685 | 21 | 1.20039 | 1.03775 | 9.17006 | 0.93441 |
| 22 | 1.22616 | 0.95511 | 8.09026 | 0.92785 | 22 | 1.19565 | 1.04924 | 9.17774 | 0.93373 |
| 23 | 1.22982 | 0.93926 | 8.17056 | 0.92884 | 23 | 1.19073 | 1.06030 | 9.18537 | 0.93303 |
| 24 | 1.23331 | 0.92266 | 8.23754 | 0.92979 | 24 | 1.18563 | 1.07095 | 9.19293 | 0.93233 |
| 25 | −1.23665 | +0.90528 | +8.29491 | −0.93072 | 25 | −1.18034 | −1.08122 | +9.20044 | −0.93161 |
| 26 | 1.23983 | 0.88704 | 8.34518 | 0.93163 | 26 | 1.17487 | 1.09114 | 9.20790 | 0.93088 |
| 27 | 1.24288 | 0.86789 | 8.38987 | 0.93250 | 27 | 1.16921 | 1.10069 | 9.21529 | 0.93014 |
| 28 | 1.24571 | 0.84770 | 8.43008 | 0.93336 | 28 | 1.16334 | 1.10992 | 9.22264 | 0.92939 |
| 29 | 1.24843 | 0.82641 | 8.46672 | 0.93418 | 29 | 1.15728 | 1.11880 | 9.22994 | 0.92863 |
| 30 | −1.25099 | +0.80390 | +8.50024 | −0.93497 | 30 | −1.15101 | −1.12741 | +9.23719 | −0.92786 |
| 31 | −1.25340 | +0.78003 | +8.53110 | −0.93574 | 31 | −1.14452 | −1.13573 | +9.24440 | −0.92709 |

## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

| Date. | A. | B. | C. | D. | Date. | A. | B. | C. | D. |
|---|---|---|---|---|---|---|---|---|---|
| May 1 | —1.14452 | —1.13573 | +9.24440 | —0.92709 | July 1 | +0.53088 | —1.30337 | +9.59262 | —0.90661 |
| 2 | 1.13780 | 1.14375 | 9.25154 | 0.92631 | 2 | 0.56841 | 1.30197 | 9.59678 | 0.90712 |
| 3 | 1.13087 | 1.15153 | 9.25864 | 0.92553 | 3 | 0.60286 | 1.30046 | 9.60087 | 0.90766 |
| 4 | 1.12371 | 1.15901 | 9.26569 | 0.92474 | 4 | 0.63462 | 1.29881 | 9.60493 | 0.90824 |
| 5 | 1.11628 | 1.16625 | 9.27270 | 0.92396 | 5 | 0.66413 | 1.29704 | 9.60893 | 0.90884 |
| 6 | —1.10860 | —1.17325 | +9.27964 | —0.92317 | 6 | +0.69166 | —1.29517 | +9.61289 | —0.90946 |
| 7 | 1.10067 | 1.18003 | 9.28655 | 0.92238 | 7 | 0.71744 | 1.29312 | 9.61679 | 0.91011 |
| 8 | 1.09247 | 1.18656 | 9.29341 | 0.92160 | 8 | 0.74166 | 1.29096 | 9.62065 | 0.91078 |
| 9 | 1.08399 | 1.19288 | 9.30023 | 0.92082 | 9 | 0.76449 | 1.28866 | 9.62446 | 0.91149 |
| 10 | 1.07521 | 1.19897 | 9.30700 | 0.92004 | 10 | 0.78607 | 1.28624 | 9.62821 | 0.91220 |
| 11 | —1.06614 | —1.20487 | +9.31372 | —0.91926 | 11 | +0.80650 | —1.28368 | +9.63192 | —0.91296 |
| 12 | 1.05674 | 1.21056 | 9.32040 | 0.91848 | 12 | 0.82590 | 1.28098 | 9.63557 | 0.91373 |
| 13 | 1.04702 | 1.21606 | 9.32703 | 0.91773 | 13 | 0.84436 | 1.27815 | 9.63918 | 0.91453 |
| 14 | 1.03695 | 1.22136 | 9.33363 | 0.91697 | 14 | 0.86196 | 1.27518 | 9.64273 | 0.91535 |
| 15 | 1.02652 | 1.22647 | 9.34017 | 0.91622 | 15 | 0.87875 | 1.27205 | 9.64624 | 0.91618 |
| 16 | —1.01572 | —1.23140 | +9.34665 | —0.91549 | 16 | +0.89480 | —1.26880 | +9.64969 | —0.91704 |
| 17 | 1.00452 | 1.23616 | 9.35309 | 0.91477 | 17 | 0.91016 | 1.26540 | 9.65311 | 0.91792 |
| 18 | 0.99291 | 1.24073 | 9.35949 | 0.91406 | 18 | 0.92490 | 1.26184 | 9.65647 | 0.91882 |
| 19 | 0.98083 | 1.24514 | 9.36586 | 0.91336 | 19 | 0.93902 | 1.25813 | 9.65980 | 0.91974 |
| 20 | 0.96832 | 1.24938 | 9.37219 | 0.91268 | 20 | 0.95260 | 1.25428 | 9.66309 | 0.92067 |
| 21 | —0.95531 | —1.25346 | +9.37847 | —0.91200 | 21 | +0.96563 | —1.25024 | +9.66632 | —0.92160 |
| 22 | 0.94176 | 1.25737 | 9.38469 | 0.91135 | 22 | 0.97818 | 1.24606 | 9.66950 | 0.92256 |
| 23 | 0.92767 | 1.26112 | 9.39086 | 0.91071 | 23 | 0.99027 | 1.24173 | 9.67263 | 0.92353 |
| 24 | 0.91299 | 1.26473 | 9.39697 | 0.91010 | 24 | 1.00188 | 1.23721 | 9.67573 | 0.92452 |
| 25 | 0.89766 | 1.26819 | 9.40302 | 0.90949 | 25 | 1.01310 | 1.23254 | 9.67876 | 0.92552 |
| 26 | —0.88168 | —1.27148 | +9.40905 | —0.90891 | 26 | +1.02383 | —1.22771 | +9.68176 | —0.92653 |
| 27 | 0.86495 | 1.27464 | 9.41504 | 0.90836 | 27 | 1.03434 | 1.22267 | 9.68473 | 0.92753 |
| 28 | 0.84742 | 1.27766 | 9.42096 | 0.90782 | 28 | 1.04443 | 1.21744 | 9.68766 | 0.92856 |
| 29 | 0.82903 | 1.28053 | 9.42684 | 0.90730 | 29 | 1.05416 | 1.21206 | 9.69053 | 0.92959 |
| 30 | 0.80970 | 1.28325 | 9.43266 | 0.90681 | 30 | 1.06351 | 1.20644 | 9.69337 | 0.93062 |
| 31 | —0.78938 | —1.28583 | +9.43845 | —0.90635 | 31 | +1.07265 | —1.20068 | +9.69616 | —0.93167 |
| June 1 | 0.76791 | 1.28830 | 9.44419 | 0.90590 | Aug. 1 | 1.08144 | 1.19469 | 9.69892 | 0.93272 |
| 2 | 0.74523 | 1.29061 | 9.44986 | 0.90549 | 2 | 1.08993 | 1.18849 | 9.70163 | 0.93376 |
| 3 | 0.72118 | 1.29280 | 9.45550 | 0.90510 | 3 | 1.09816 | 1.18207 | 9.70430 | 0.93481 |
| 4 | 0.69559 | 1.29485 | 9.46109 | 0.90475 | 4 | 1.10610 | 1.17543 | 9.70693 | 0.93586 |
| 5 | —0.66828 | —1.29677 | +9.46663 | —0.90442 | 5 | +1.11378 | —1.16856 | +9.70952 | —0.93691 |
| 6 | 0.63900 | 1.29857 | 9.47211 | 0.90411 | 6 | 1.12123 | 1.16146 | 9.71208 | 0.93796 |
| 7 | 0.60745 | 1.30023 | 9.47754 | 0.90383 | 7 | 1.12844 | 1.15410 | 9.71459 | 0.93900 |
| 8 | 0.57326 | 1.30177 | 9.48293 | 0.90359 | 8 | 1.13540 | 1.14650 | 9.71707 | 0.94005 |
| 9 | 0.53600 | 1.30319 | 9.48827 | 0.90337 | 9 | 1.14213 | 1.13864 | 9.71952 | 0.94108 |
| 10 | —0.49523 | —1.30447 | +9.49354 | —0.90318 | 10 | +1.14864 | —1.13051 | +9.72191 | —0.94212 |
| 11 | 0.45009 | 1.30564 | 9.49877 | 0.90303 | 11 | 1.15494 | 1.12209 | 9.72429 | 0.94314 |
| 12 | 0.39960 | 1.30668 | 9.50394 | 0.90290 | 12 | 1.16103 | 1.11338 | 9.72661 | 0.94417 |
| 13 | 0.34234 | 1.30759 | 9.50907 | 0.90281 | 13 | 1.16692 | 1.10436 | 9.72891 | 0.94518 |
| 14 | 0.27626 | 1.30839 | 9.51414 | 0.90274 | 14 | 1.17262 | 1.09502 | 9.73118 | 0.94619 |
| 15 | —0.19816 | —1.30906 | +9.51916 | —0.90272 | 15 | +1.17811 | —1.08534 | +9.73342 | —0.94718 |
| 16 | 0.10272 | 1.30960 | 9.52414 | 0.90272 | 16 | 1.18342 | 1.07532 | 9.73562 | 0.94816 |
| 17 | 9.98007 | 1.31003 | 9.52906 | 0.90274 | 17 | 1.18856 | 1.06493 | 9.73778 | 0.94914 |
| 18 | 9.80840 | 1.31034 | 9.53392 | 0.90282 | 18 | 1.19350 | 1.05415 | 9.73991 | 0.95010 |
| 19 | 9.52013 | 1.31053 | 9.53875 | 0.90292 | 19 | 1.19827 | 1.04297 | 9.74201 | 0.95105 |
| 20 | —8.28298 | —1.31060 | +9.54352 | —0.90306 | 20 | +1.20287 | —1.03137 | +9.74408 | —0.95198 |
| 21 | +9.46680 | 1.31055 | 9.54824 | 0.90323 | 21 | 1.20731 | 1.01933 | 9.74613 | 0.95290 |
| 22 | 9.78170 | 1.31037 | 9.55291 | 0.90343 | 22 | 1.21157 | 1.00681 | 9.74815 | 0.95379 |
| 23 | 9.96224 | 1.31008 | 9.55753 | 0.90365 | 23 | 1.21568 | 0.99378 | 9.75014 | 0.95467 |
| 24 | 0.08933 | 1.30967 | 9.56209 | 0.90391 | 24 | 1.21963 | 0.98023 | 9.75211 | 0.95552 |
| 25 | +0.18740 | —1.30913 | +9.56660 | —0.90420 | 25 | +1.22341 | —0.96610 | +9.75403 | —0.95637 |
| 26 | 0.26730 | 1.30847 | 9.57107 | 0 90453 | 26 | 1.22705 | 0.95135 | 9.75594 | 0.95720 |
| 27 | 0.33460 | 1.30770 | 9.57548 | 0.90489 | 27 | 1.23054 | 0.93595 | 9.75783 | 0.95798 |
| 28 | 0.39278 | 1.30680 | 9.57984 | 0.90528 | 28 | 1.23399 | 0.91984 | 9.75969 | 0.95878 |
| 29 | 0.44398 | 1.30578 | 9.58415 | 0.90569 | 29 | 1.23707 | 0.90298 | 9.76152 | 0.95956 |
| 30 | +0.48966 | —1.30463 | +9.58842 | —0.90614 | 30 | +1.24010 | —0.88531 | +9.76333 | —0.96030 |
| 31 | +0.53088 | —1.30337 | +9.59262 | —0.90661 | 31 | +1.24302 | —0.86676 | +9.76512 | —0.96102 |

## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

| Date. | A. | B. | C. | D. | Date. | A. | B. | C. | D. |
|---|---|---|---|---|---|---|---|---|---|
| Sept. 1 | +1.24578 | —0.84722 | +9.76689 | —0.96171 | Nov. 1 | +1.15739 | +1.11869 | +9.86263 | —0.95255 |
| 2 | 1.24840 | 0.82633 | 9.76864 | 0.96238 | 2 | 1.15090 | 1.12758 | 9.86436 | 0.95172 |
| 3 | 1.25088 | 0.80486 | 9.77037 | 0.96302 | 3 | 1.14415 | 1.13618 | 9.86611 | 0.95088 |
| 4 | 1.25322 | 0.78180 | 9.77208 | 0.96364 | 4 | 1.13717 | 1.14448 | 9.86787 | 0.95003 |
| 5 | 1.25545 | 0.75730 | 9.77376 | 0.96424 | 5 | 1.12994 | 1.15250 | 9.86964 | 0.94918 |
| 6 | +1.25753 | —0.73120 | +9.77543 | —0.96481 | 6 | +1.12244 | +1.16025 | +9.87143 | —0.94834 |
| 7 | 1.25947 | 0.70335 | 9.77708 | 0.96536 | 7 | 1.11469 | 1.16777 | 9.87322 | 0.94747 |
| 8 | 1.26128 | 0.67337 | 9.77871 | 0.96589 | 8 | 1.10665 | 1.17495 | 9.87502 | 0.94662 |
| 9 | 1.26297 | 0.64101 | 9.78034 | 0.96638 | 9 | 1.09830 | 1.18194 | 9.87684 | 0.94576 |
| 10 | 1.26451 | 0.60589 | 9.78195 | 0.96684 | 10 | 1.08967 | 1.18868 | 9.87867 | 0.94491 |
| 11 | +1.26594 | —0.56753 | +9.78355 | —0.96728 | 11 | +1.08072 | +1.19518 | +9.88051 | —0.94406 |
| 12 | 1.26723 | 0.52529 | 9.78513 | 0.96768 | 12 | 1.07143 | 1.20147 | 9.88236 | 0.94321 |
| 13 | 1.26839 | 0.47832 | 9.78670 | 0.96805 | 13 | 1.06180 | 1.20754 | 9.88422 | 0.94236 |
| 14 | 1.26942 | 0.42547 | 9.78826 | 0.96840 | 14 | 1.05182 | 1.21339 | 9.88609 | 0.94152 |
| 15 | 1.27033 | 0.36512 | 9.78981 | 0.96873 | 15 | 1.04145 | 1.21903 | 9.88796 | 0.94069 |
| 16 | +1.27111 | —0.29480 | +9.79135 | —0.96902 | 16 | +1.03070 | +1.22447 | +9.88984 | —0.93986 |
| 17 | 1.27176 | 0.21068 | 9.79288 | 0.96929 | 17 | 1.01950 | 1.22971 | 9.89174 | 0.93904 |
| 18 | 1.27229 | 0.10600 | 9.79441 | 0.96953 | 18 | 1.00790 | 1.23475 | 9.89364 | 0.93824 |
| 19 | 1.27269 | 9.96748 | 9.79592 | 0.96973 | 19 | 0.99582 | 1.23960 | 9.89555 | 0.93745 |
| 20 | 1.27296 | 9.76259 | 9.79742 | 0.96990 | 20 | 0.98326 | 1.24429 | 9.89747 | 0.93665 |
| 21 | +1.27311 | —9.36071 | +9.79892 | —0.97004 | 21 | +0.97018 | +1.24877 | +9.89939 | —0.93589 |
| 22 | 1.27313 | +9.08002 | 9.80041 | 0.97014 | 22 | 0.95655 | 1.25308 | 9.90131 | 0.93513 |
| 23 | 1.27302 | 9.67218 | 9.80190 | 0.97022 | 23 | 0.94232 | 1.25721 | 9.90325 | 0.93441 |
| 24 | 1.27278 | 9.91387 | 9.80339 | 0.97027 | 24 | 0.92748 | 1.26119 | 9.90519 | 0.93368 |
| 25 | 1.27242 | 0.06818 | 9.80487 | 0.97028 | 25 | 0.91196 | 1.26498 | 9.90715 | 0.93299 |
| 26 | +1.27192 | +0.18179 | +9.80636 | —0.97028 | 26 | +0.89572 | +1.26865 | +9.90911 | —0.93230 |
| 27 | 1.27130 | 0.27167 | 9.80783 | 0.97024 | 27 | 0.87868 | 1.27207 | 9.91107 | 0.93164 |
| 28 | 1.27055 | 0.34611 | 9.80930 | 0.97018 | 28 | 0.86082 | 1.27536 | 9.91304 | 0.93102 |
| 29 | 1.26968 | 0.40952 | 9.81077 | 0.97008 | 29 | 0.84205 | 1.27852 | 9.91501 | 0.93040 |
| 30 | 1.26867 | 0.46474 | 9.81224 | 0.96995 | 30 | 0.82228 | 1.28151 | 9.91698 | 0.92981 |
| 31 | +1.26753 | +0.51366 | +9.81372 | —0.96978 | 31 | +0.80139 | +1.28435 | +9.91895 | —0.92925 |
| Oct. 1 | 1.26753 | 0.51366 | 9.81372 | 0.96978 | Dec. 1 | 0.80139 | 1.28435 | 9.91895 | 0.92925 |
| 2 | 1.26625 | 0.55751 | 9.81520 | 0.96959 | 2 | 0.77934 | 1.28702 | 9.92093 | 0.92870 |
| 3 | 1.26484 | 0.59724 | 9.81668 | 0.96938 | 3 | 0.75593 | 1.28956 | 9.92290 | 0.92819 |
| 4 | 1.26331 | 0.63355 | 9.81816 | 0.96913 | 4 | 0.73102 | 1.29193 | 9.92488 | 0.92771 |
| 5 | +1.26162 | +0.66695 | +9.81965 | —0.96885 | 5 | +0.70441 | +1.29417 | +9.92686 | —0.92726 |
| 6 | 1.25980 | 0.69795 | 9.82113 | 0.96855 | 6 | 0.67604 | 1.29626 | 9.92884 | 0.92684 |
| 7 | 1.25784 | 0.72671 | 9.82263 | 0.96821 | 7 | 0.64545 | 1.29819 | 9.93081 | 0.92644 |
| 8 | 1.25575 | 0.75358 | 9.82413 | 0.96786 | 8 | 0.61241 | 1.29999 | 9.93277 | 0.92607 |
| 9 | 1.25352 | 0.77879 | 9.82563 | 0.96746 | 9 | 0.57646 | 1.30164 | 9.93474 | 0.92573 |
| 10 | +1.25114 | +0.80250 | +9.82713 | —0.96706 | 10 | +0.53713 | +1.30316 | +9.93672 | —0.92544 |
| 11 | 1.24861 | 0.82488 | 9.82865 | 0.96662 | 11 | 0.49370 | 1.30452 | 9.93870 | 0.92517 |
| 12 | 1.24594 | 0.84603 | 9.83018 | 0.96615 | 12 | 0.44528 | 1.30576 | 9.94067 | 0.92493 |
| 13 | 1.24312 | 0.87607 | 9.83171 | 0.96565 | 13 | 0.39062 | 1.30685 | 9.94263 | 0.92472 |
| 14 | 1.24014 | 0.88511 | 9.83325 | 0.96514 | 14 | 0.32790 | 1.30780 | 9.94459 | 0.92456 |
| 15 | +1.23702 | +0.90324 | +9.83479 | —0.96461 | 15 | +0.25438 | +1.30861 | +9.94653 | —0.92442 |
| 16 | 1.23375 | 0.92051 | 9.83634 | 0.96405 | 16 | 0.16564 | 1.30928 | 9.94848 | 0.92433 |
| 17 | 1.23031 | 0.93701 | 9.83791 | 0.96346 | 17 | 0.05381 | 1.30981 | 9.95042 | 0.92427 |
| 18 | 1.22671 | 0.95280 | 9.83950 | 0.96285 | 18 | 9.99255 | 1.31021 | 9.95236 | 0.92425 |
| 19 | 1.22295 | 0.96791 | 9.84109 | 0.96223 | 19 | 9.66809 | 1.31047 | 9.95428 | 0.92426 |
| 20 | +1.21901 | +0.98239 | +9.84268 | —0.96159 | 20 | +9.12126 | +1.31059 | +9.95621 | —0.92430 |
| 21 | 1.21490 | 0.99629 | 9.84428 | 0.96093 | 21 | —9.30386 | 1.31057 | 9.95812 | 0.92437 |
| 22 | 1.21063 | 1.00965 | 9.84588 | 0.96023 | 22 | 9.72823 | 1.31042 | 9.96003 | 0.92449 |
| 23 | 1.20618 | 1.02248 | 9.84750 | 0.95953 | 23 | 9.93868 | 1.31013 | 9.96193 | 0.92463 |
| 24 | 1.20155 | 1.03482 | 9.84914 | 0.95881 | 24 | 0.07973 | 1.30971 | 9.96383 | 0.92483 |
| 25 | +1.19673 | +1.04670 | +9.85078 | —0.95807 | 25 | —0.18594 | +1.30914 | +9.96570 | —0.92504 |
| 26 | 1.19172 | 1.05813 | 9.85245 | 0.95732 | 26 | 0.27112 | 1.30843 | 9.96756 | 0.92529 |
| 27 | 1.18651 | 1.06916 | 9.85411 | 0.95656 | 27 | 0.34214 | 1.30760 | 9.96941 | 0.92559 |
| 28 | 1.18111 | 1.07978 | 9.85580 | 0.95578 | 28 | 0.40307 | 1.30661 | 9.97125 | 0.92591 |
| 29 | 1.17550 | 1.09003 | 9.85749 | 0.95499 | 29 | 0.45638 | 1.30550 | 9.97308 | 0.92627 |
| 30 | +1.16968 | +1.09993 | +9.85919 | —0.95419 | 30 | —0.50372 | +1.30423 | +9.97490 | —0.92668 |
| 31 | +1.16363 | +1.10947 | +9.86091 | —0.95338 | 31 | —0.54629 | +1.30281 | +9.97670 | —0.92711 |

## FOR WASHINGTON MEAN MIDNIGHT.

## CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.

| 1856. | *f.* | Log. *g.* | G. | Log. *h.* | H. | Log. *i.* | T. |
|---|---|---|---|---|---|---|---|
| | ″ | | ° ′ | | ° ′ | | |
| January 1 | − 7.25 | 0.9062 | 246 56 | 1.3093 | 349 50 | —0.1933 | 0.000 |
| 6 | 6.36 | 0.9016 | 249 41 | 1.3079 | 345 7 | 0.3551 | 0.014 |
| 11 | 5.49 | 0.8991 | 252 27 | 1.3061 | 240 22 | 0.4699 | 0.027 |
| 16 | 4.65 | 0.8984 | 255 11 | 1.3037 | 335 34 | 0.5578 | 0.041 |
| 21 | 3.83 | 0.8993 | 257 51 | 1.3010 | 330 43 | 0.6279 | 0.055 |
| 26 | − 3.05 | 0.9017 | 260 26 | 1.2981 | 325 49 | —0.6852 | 0.068 |
| 31 | 2.30 | 0.9054 | 262 51 | 1.2949 | 320 51 | 0.7327 | 0.082 |
| February 5 | 1.59 | 0.9099 | 265 7 | 1.2916 | 315 49 | 0.7723 | 0.096 |
| 10 | 0.91 | 0.9150 | 267 14 | 1.2883 | 310 42 | 0.8055 | 0.110 |
| 15 | − 0.27 | 0.9204 | 269 11 | 1.2851 | 305 32 | 0.8331 | 0.123 |
| 20 | + 0.33 | 0.9259 | 270 59 | 1.2821 | 300 18 | —0.8558 | 0.137 |
| 25 | 0.91 | 0.9312 | 272 39 | 1.2794 | 295 0 | 0.8741 | 0.151 |
| March 1 | 1.46 | 0.9362 | 274 13 | 1.2771 | 289 39 | 0.8885 | 0.164 |
| 6 | 1.99 | 0.9406 | 275 41 | 1.2752 | 284 17 | 0.8991 | 0.178 |
| 11 | 2.50 | 0.9445 | 277 6 | 1.2739 | 278 52 | 0.9062 | 0.192 |
| 16 | + 3.00 | 0.9479 | 278 28 | 1.2733 | 273 27 | —0.9099 | 0.205 |
| 21 | 3.49 | 0.9506 | 279 49 | 1.2731 | 268 3 | 0.9104 | 0.219 |
| 26 | 3.99 | 0.9528 | 281 10 | 1.2737 | 262 40 | 0.9074 | 0.233 |
| 31 | 4.50 | 0.9545 | 282 34 | 1.2748 | 257 19 | 0.9015 | 0.246 |
| April 5 | 5.02 | 0.9558 | 284 0 | 1.2765 | 252 0 | 0.8921 | 0.260 |
| 10 | + 5.55 | 0.9568 | 285 29 | 1.2785 | 246 46 | —0.8793 | 0.274 |
| 15 | 6.11 | 0.9577 | 287 3 | 1.2811 | 241 36 | 0.8628 | 0.287 |
| 20 | 6.70 | 0.9586 | 288 42 | 1.2839 | 236 30 | 0.8424 | 0.301 |
| 25 | 7.31 | 0.9598 | 290 26 | 1.2869 | 231 29 | 0.8178 | 0.315 |
| 30 | 7.96 | 0.9615 | 292 14 | 1.2901 | 226 33 | 0.7885 | 0.329 |
| May 5 | + 8.63 | 0.9637 | 294 7 | 1.2932 | 221 43 | —0.7538 | 0.342 |
| 10 | 9.34 | 0.9665 | 296 3 | 1.2963 | 216 57 | 0.7127 | 0.356 |
| 15 | 10.08 | 0.9704 | 298 2 | 1.2993 | 212 15 | 0.6640 | 0.370 |
| 20 | 10.86 | 0.9752 | 300 1 | 1.3020 | 207 38 | 0.6058 | 0.383 |
| 25 | 11.65 | 0.9811 | 302 0 | 1.3044 | 203 5 | 0.5351 | 0.397 |
| 30 | +12.48 | 0.9880 | 303 57 | 1.3065 | 198 35 | —0.4472 | 0.411 |
| June 4 | 13.32 | 0.9959 | 305 50 | 1.3084 | 194 7 | 0.3331 | 0.424 |
| 9 | 14.18 | 1.0047 | 307 38 | 1.3094 | 189 42 | 0.1735 | 0.438 |
| 14 | 15.05 | 1.0143 | 309 20 | 1.3103 | 185 18 | 9.9137 | 0.452 |
| 19 | 15.93 | 1.0247 | 310 56 | 1.3106 | 180 56 | —9.1576 | 0.465 |
| 24 | +16.81 | 1.0356 | 312 24 | 1.3104 | 176 33 | +9.7268 | 0.479 |
| 29 | 17.69 | 1.0468 | 313 44 | 1.3099 | 172 10 | 0.0815 | 0.493 |
| July 4 | 18.55 | 1.0582 | 314 56 | 1.3088 | 167 46 | 0.2721 | 0.507 |
| 9 | 19.41 | 1.0697 | 316 0 | 1.3073 | 163 21 | 0.4020 | 0.520 |
| 14 | 20.24 | 1.0812 | 316 57 | 1.3054 | 158 53 | 0.4994 | 0.534 |
| 19 | +21.05 | 1.0924 | 317 47 | 1.3031 | 154 23 | +0.5765 | 0.548 |
| 24 | 21.84 | 1.1034 | 318 31 | 1.3005 | 149 49 | 0.6394 | 0 561 |
| 29 | 22.60 | 1.1140 | 319 9 | 1.2977 | 145 12 | 0.6916 | 0.575 |
| August 3 | 23.32 | 1.1242 | 319 43 | 1.2947 | 140 30 | 0.7356 | 0.589 |
| 8 | 24.02 | 1.1339 | 320 12 | 1.2915 | 135 44 | 0.7729 | 0.602 |
| 13 | +24.68 | 1.1429 | 320 38 | 1.2884 | 130 53 | +0.8044 | 0.616 |
| 18 | 25.32 | 1.1515 | 321 1 | 1.2853 | 125 58 | 0.8310 | 0.630 |
| 23 | 25.92 | 1.1595 | 321 23 | 1.2825 | 120 58 | 0.8532 | 0.643 |
| 28 | 26.50 | 1.1669 | 321 44 | 1.2799 | 115 53 | 0.8715 | 0.657 |
| Sept. 2 | 27.05 | 1.1739 | 322 5 | 1.2775 | 110 44 | 0.8859 | 0.671 |
| 7 | +27.58 | 1.1803 | 322 26 | 1.2757 | 105 32 | +0.8969 | 0.684 |
| 12 | 28.09 | 1.1862 | 322 48 | 1.2743 | 100 16 | 0.9047 | 0.698 |
| 17 | 28.60 | 1.1917 | 323 11 | 1.2734 | 94 58 | 0.9092 | 0.712 |
| 22 | 29.10 | 1.1968 | 323 36 | 1.2731 | 89 38 | 0.9106 | 0.726 |
| 27 | 29.60 | 1.2017 | 324 4 | 1.2735 | 84 17 | 0.9088 | 0.739 |
| October 2 | +30.11 | 1.2063 | 324 34 | 1.2744 | 78 56 | +0.9037 | 0.753 |
| 7 | 30.63 | 1.2109 | 325 7 | 1.2759 | 73 36 | 0.8953 | 0.767 |
| 12 | +31.17 | 1.2155 | 325 43 | 1.2779 | 68 17 | +0.8834 | 0.780 |

## FOR WASHINGTON MEAN MIDNIGHT.

### CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.

| 1856. | | *f.* | Log. *g.* | G. | Log. *h.* | H. | Log. *i.* | τ. |
|---|---|---|---|---|---|---|---|---|
| | | ″ | | ° ′ | | ° ′ | | |
| October | 17 | +31.73 | 1.2199 | 326 21 | 1.2803 | 63 1 | +0.8678 | 0.794 |
| | 22 | 32.31 | 1.2243 | 327 1 | 1.2831 | 57 48 | 0.8481 | 0.808 |
| | 27 | 32.93 | 1.2292 | 327 44 | 1.2862 | 52 39 | 0.8240 | 0.821 |
| Nov. | 1 | 33.58 | 1.2343 | 328 29 | 1.2894 | 47 33 | 0.7949 | 0.835 |
| | 6 | 34.27 | 1.2395 | 329 14 | 1.2926 | 42 31 | 0.7599 | 0.849 |
| | 11 | +34.99 | 1.2452 | 330 0 | 1.2959 | 37 32 | +0.7182 | 0.862 |
| | 16 | 35.75 | 1.2512 | 330 46 | 1.2991 | 32 37 | 0.6682 | 0.876 |
| | 21 | 36.55 | 1.2577 | 331 31 | 1.3019 | 27 46 | 0.6077 | 0.890 |
| | 26 | 37.38 | 1.2643 | 332 15 | 1.3044 | 22 58 | 0.5332 | 0.903 |
| Dec. | 1 | 38.23 | 1.2715 | 332 57 | 1.3065 | 18 12 | 0.4389 | 0.917 |
| | 6 | +39.11 | 1.2788 | 333 36 | 1.3083 | 13 29 | +0.3135 | 0.931 |
| | 11 | 40.01 | 1.2865 | 334 12 | 1.3097 | 8 47 | 0.1312 | 0.945 |
| | 16 | 40.92 | 1.2943 | 334 45 | 1.3104 | 4 7 | +9.8031 | 0.958 |
| | 21 | 41.84 | 1.3023 | 335 14 | 1.3106 | 359 26 | −8.9413 | 0.972 |
| | 26 | 42.76 | 1.3103 | 335 40 | 1.3102 | 354 46 | 9.9086 | 0.986 |
| | 31 | +43.67 | 1.3181 | 336 1 | 1.3094 | 350 4 | −0.1838 | 0.999 |

### BESSEL'S FORMULÆ OF REDUCTION FOR THE FIXED STARS,

#### WITH DR. PETERS'S COEFFICIENTS, AND THE NOTATION OF THE CATALOGUE OF STARS OF THE BRITISH ASSOCIATION.

$A = -20''.4451 \cos\omega \cos\odot.$

$B = -20''.4451 \sin\odot.$

$$C = \tau - 0''.34238 \sin \text{☊} + 0''.00410 \sin 2\,\text{☊} - 0''.02519 \sin 2\odot.$$
$$+ 0''.00294 \sin(\odot + 82^\circ\, 34') - 0''.00405 \sin 2\,\text{☾} + 0''.00135 \sin(\text{☾} - \Gamma').$$

$$D = -9''.2236 \cos \text{☊} + 0''.0896 \cos 2\,\text{☊} - 0''.5507 \cos 2\odot - 0''.0092 \cos(\odot + 280^\circ\, 22').$$
$$- 0.0885 \cos 2\,\text{☾}.$$

$E = -0''.0481 \sin \text{☊} + 0''.0014 \sin 2\,\text{☊} - 0''.0034 \sin 2\odot.$

$a = \cos\alpha \sec\delta.$
$b = \sin\alpha \sec\delta.$
$c = 46''.0780 + 20''.0560 \sin\alpha \tan\delta.$
$d = \cos\alpha \tan\delta.$

$a' = \tan\omega \cos\delta - \sin\alpha \sin\delta.$
$b' = \cos\alpha \sin\delta.$
$c' = 20''.0560 \cos\alpha.$
$d' = -\sin\alpha.$

$\mu$ = the annual proper motion in right ascension.
$\mu'$ = the annual proper motion in declination.

$\tau$ = the time from the beginning of the year in fractional parts of the year.
$\odot$ = the sun's longitude.
$\text{☾}$ = the moon's longitude.
$\text{☊}$ = the longitude of the moon's ascending node.
$\omega$ = the obliquity of the ecliptic.
$\alpha$ = the star's mean right ascension for the beginning of the year.
$\delta$ = the star's mean declination for the beginning of the year.
$\alpha'$ = the star's apparent right ascension at the time $\tau$.
$\delta'$ = the star's apparent declination at the time $\tau$.

$$\alpha' - \alpha = A\,a + B\,b + C\,c + D\,d + E + \tau\,\mu.$$
$$\delta' - \delta = A\,a' + B\,b' + C\,c' + D\,d' + \tau\,\mu'.$$

The following formulæ may also be used by putting

$f = 46''.0780\ C.$ $\qquad i = A \tan\omega.$
$g \cos G = 20''.0560\ C.$ $\qquad h \cos H = B.$
$g \sin G = D.$ $\qquad h \sin H = A.$

$$\alpha' - \alpha = f + \tau\,\mu + g \sin(G + \alpha) \tan\delta + h \sin(H + \alpha) \sec\delta.$$
$$\delta' - \delta = i \cos\delta + \tau\,\mu' + g \cos(G + \alpha) + h \cos(H + \alpha) \sin\delta.$$

### MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR JANUARY 1, 1856.

| Star's Name. | Magnitude. | Right Ascension. | An. Variation. | Declination. | An. Variation. |
|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ |
| α Andromedæ . | 2 | 0 0 57.06 | + 3.086 | +28 17 43.2 | +19.93 |
| γ Pegasi (*Algenib*) | 3.2 | 0 5 49.46 | 3.084 | +14 22 58.1 | 20.04 |
| β Hydri . . . | 3 | 0 18 6.91 | 3.291 | —78 3 57.9 | 20.24 |
| α Cassiopeæ . | var. | 0 32 21.65 | 3.358 | +55 44 49.1 | 19.83 |
| β Ceti . . . | 2 | 0 36 21.49 | 3.016 | —18 46 40.2 | 19.86 |
| α Urs. Min. (*Polaris*) | 2 | 1 6 48.54 | +18.336 | +88 32 30.6 | +19.21 |
| $\theta^1$ Ceti . . . | 3 | 1 16 49.60 | 3.000 | — 8 55 39.9 | 18.74 |
| α Eridani (*Achernar*) | 1 | 1 32 20.72 | 2.238 | —57 58 9.5 | 18.45 |
| α Arietis . . | 2 | 1 59 3.82 | 3.365 | +22 46 45.8 | 17.29 |
| γ Ceti . . . | 3.4 | 2 35 50.53 | 3.102 | + 2 37 35.1 | 15.44 |
| α Ceti . . . | 2.3 | 2 54 45.29 | + 3.129 | + 3 31 19.2 | +14.40 |
| α Persei . . . | 2 | 3 14 3.76 | 4.243 | +49 20 40.3 | 13.25 |
| η Tauri . . | 3 | 3 38 55.85 | 3.553 | +23 39 22.7 | 11.54 |
| $\gamma^1$ Eridani . . . | 3 | 3 51 18.69 | 2.796 | —13 55 16.7 | 10.58 |
| α Tauri (*Aldebaran*) | 1 | 4 27 39.69 | 3.436 | +16 12 57.4 | 7.72 |
| α Aurigæ (*Capella*) . | 1 | 5 6 3.46 | + 4.423 | +45 50 45.7 | + 4.26 |
| β Orionis (*Rigel*) | 1 | 5 7 37.10 | 2.884 | — 8 22 17.7 | 4.54 |
| β Tauri . . | 2 | 5 17 11.53 | 3.791 | +28 28 51.9 | 3.53 |
| δ Orionis . . | 2 | 5 24 39.09 | 3.066 | — 0 24 34.6 | 3.05 |
| α Leporis . . | 3 | 5 26 22.82 | 2.648 | —17 55 43.0 | 2.94 |
| ε Orionis . . | 2 | 5 28 54.45 | + 3.044 | — 1 17 51.6 | + 2.71 |
| α Columbæ . . | 2 | 5 34 26.21 | 2.177 | —34 9 11.7 | 2.23 |
| α Orionis . . | var. | 5 47 22.60 | 3.249 | + 7 22 34.0 | + 1.11 |
| μ Geminorum . | 3 | 6 14 14.91 | 3.636 | +22 34 58.6 | — 1.38 |
| α Argus (*Canopus*) . | 1 | 6 20 45.46 | 1.330 | —52 37 6.5 | 1.81 |
| 51 (Hev.) Cephei . | 5 | 6 31 36.06 | +30.511 | +87 15 5.2 | — 2.84 |
| α Canis Maj. (*Sirius*) | 1 | 6 38 48.04 | 2.646 | —16 31 19.0 | 4.52 |
| ε Canis Majoris . | 2.1 | 6 52 58.02 | 2.360 | —28 46 45.3 | 4.58 |
| δ Geminorum . | 3.4 | 7 11 31.22 | 3.597 | +22 14 35.7 | 6.16 |
| $\alpha^2$ Geminor. (*Castor*) | 2.1 | 7 25 24.38 | 3.847 | +32 11 58.9 | 7.38 |
| α Can. Min. (*Procyon*) | 1 | 7 31 45.67 | + 3.145 | + 5 35 27.1 | — 8.79 |
| β Geminor. (*Pollux*) | 1.2 | 7 36 29.91 | 3.681 | +28 22 11.6 | 8.25 |
| 15 Argus . . . | 3 | 8 1 24.72 | 2.558 | —23 53 30.7 | 10.06 |
| ε Hydræ . . | 3.4 | 8 39 8.87 | 3.189 | + 6 56 39.5 | 12.86 |
| ι Ursæ Majoris . | 3 | 8 49 19.63 | 4.143 | +48 36 12.9 | 13.78 |
| ι Argus . . | 2 | 9 13 14.12 | + 1.602 | —58 40 18.2 | —14.89 |
| α Hydræ . . . | 2 | 9 20 30.61 | 2.951 | — 8 2 11.8 | 15.36 |
| θ Ursæ Majoris . | 3 | 9 23 12.00 | 4.045 | +52 19 50.1 | 16.14 |
| ε Leonis . . . | 3 | 9 37 40.23 | 3.424 | +24 26 6.3 | 16.34 |
| α Leonis (*Regulus*) | 1.2 | 10 0 41.93 | 3.205 | +12 40 9.4 | 17.40 |
| η Argus . . | 2 | 10 39 29.05 | + 2.305 | —58 55 40.8 | —18.73 |
| α Ursæ Majoris . | 2 | 10 54 48.33 | 3.779 | +62 31 38.1 | 19.34 |
| δ Leonis . . | 2.3 | 11 6 26.68 | 3.208 | +21 18 43.1 | 19.65 |
| δ Hydræ et Crateris | 3.4 | 11 12 8.59 | + 2.997 | —18 59 59.7 | —19.45 |

## MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR JANUARY 1, 1856.

| Star's Name. | Magnitude. | Right Ascension. | An. Variation. | Declination. | An. Variation. |
|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ |
| β Leonis . . . | 2 | 11 41 42.67 | + 3.066 | +15 22 37.1 | —20.09 |
| γ Ursæ Majoris . | 2.3 | 11 46 14.19 | 3.200 | +54 29 43.1 | 20.04 |
| β Chamæleontis . | 5 | 12 9 59.37 | 3.314 | —78 30 45.4 | 20.05 |
| $\alpha^1$ Crucis . . | 1 | 12 18 37.06 | 3.253 | —62 17 59.1 | 19.94 |
| β Corvi . . . | 2.3 | 12 26 49.69 | 3.132 | —22 35 59.5 | 19.99 |
| 12 Canum Venaticorum | 3 | 12 49 17.05 | + 2.822 | +39 5 49.0 | —19.56 |
| α Virginis (*Spica*) | 1 | 13 17 36.66 | 3.152 | —10 24 30.3 | 18.97 |
| η Ursæ Majoris . | 2 | 13 41 51.70 | 2.371 | +50 1 59.8 | 18.14 |
| η Bootis . . | 3 | 13 47 49.69 | 2.862 | +19 7 16.6 | 18.23 |
| β Centauri . | 1 | 13 53 42.08 | 4.147 | —59 40 32.0 | 17.72 |
| α Bootis (*Arcturus*) | 1 | 14 9 5.63 | + 2.734 | +19 56 2.5 | —18.94 |
| $\alpha^2$ Centauri . . | 1 | 14 29 51.90 | 4.023 | —60 14 8.4 | 15.09 |
| ε Bootis . . | 2.3 | 14 38 41.84 | 2.622 | +27 41 0.3 | 15.44 |
| $\alpha^2$ Libræ . . . | 3 | 14 42 55.10 | + 3.310 | —15 26 26.4 | 15.27 |
| β Ursæ Minoris . | 2 | 14 51 10.38 | — 0.268 | +74 44 37.7 | 14.78 |
| β Libræ . . . | 2 | 15 9 15.73 | + 3.220 | — 8 50 54.7 | —13.60 |
| α Coronæ Borealis | 2 | 15 28 35.48 | 2.539 | +27 12 6.7 | 12.38 |
| α Serpentis . . | 2.3 | 15 37 10.61 | + 2.953 | + 6 52 54.3 | 11.65 |
| ζ Ursæ Minoris . | 4.5 | 15 49 17.74 | — 2.304 | +78 14 7.1 | 10.82 |
| $\beta^1$ Scorpii . . . | 2 | 15 57 4.14 | + 3.479 | —19 24 27.0 | 10.28 |
| δ Ophiuchi . . | 3 | 16 6 48.10 | + 3.138 | — 3 19 12.2 | — 9.63 |
| α Scorpii (*Antares*) | 1.2 | 16 20 35.04 | 3.669 | —26 6 29.5 | 8.46 |
| η Draconis . . | 3.2 | 16 22 3.27 | 0.821 | +61 50 28.0 | 8.23 |
| α Trianguli Australis | 2 | 16 33 27.71 | + 6.268 | —68 45 20.3 | 7.48 |
| ε Ursæ Minoris . . | 4.5 | 17 0 51.86 | — 6.504 | +82 16 1.5 | 5.12 |
| α Herculis . . | var. | 17 8 4.90 | + 2.734 | +14 33 28.2 | — 4.47 |
| β Draconis . . | 3.2 | 17 27 10.83 | 1.353 | +52 24 34.6 | 2.85 |
| α Ophiuchi . . | 2 | 17 28 15.01 | 2.781 | +12 40 5.9 | 2.96 |
| σ Octantis . . | 6 | 17 40 51.85 | 108.772 | —89 16 34.9 | 1.68 |
| γ Draconis . . | 2.3 | 17 53 15.79 | 1.394 | +51 30 26.5 | — 0.62 |
| $\mu^1$ Sagittarii . . | 4 | 18 5 9.01 | + 3.587 | —21 5 31.7 | + 0.47 |
| δ Ursæ Minoris . | 4.5 | 18 18 47.75 | —19.330 | +86 36 0.5 | 1.66 |
| α Lyræ (*Vega*) . | 1 | 18 32 3.70 | + 2.032 | +38 39 7.9 | 3.07 |
| β Lyræ . . | var. | 18 44 45.76 | 2.215 | +33 11 52.8 | 3.87 |
| ζ Aquilæ . . | 3 | 18 58 47.40 | 2.755 | +13 39 10.2 | 5.03 |
| δ Aquilæ . . | 3.4 | 19 18 14.19 | + 3.027 | + 2 49 52.2 | + 6.82 |
| γ Aquilæ . . | 3 | 19 39 24.76 | 2.857 | +10 15 55.9 | 8.44 |
| α Aquilæ (*Altair*) | 1.2 | 19 43 45.37 | 2.925 | + 8 29 28.7 | 9.15 |
| β Aquilæ . . | 4 | 19 48 14.33 | + 2.952 | + 6 3 1.0 | 8.58 |
| λ Ursæ Minoris . | 5 | 20 7 35.54 | —55.131 | +88 52 42.6 | 10.64 |
| $\alpha^2$ Capricorni . . | 3.4 | 20 10 3.64 | + 3.338 | —12 59 16.3 | +10.81 |
| α Pavonis . . | 2 | 20 14 13.99 | 4.803 | —57 11 28.9 | 11.05 |
| α Cygni . . . | 2.1 | 20 36 31.35 | 2.044 | +44 46 3.5 | 12.65 |
| $61^1$ Cygni . . | 5.6 | 21 0 26.53 | 2.676 | +38 2 36.9 | +17.50 |

### MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR JANUARY 1, 1856.

| Star's Name. | Magnitude. | Right Ascension. | An. Variation. | Declination. | An. Variation. |
|---|---|---|---|---|---|
| | | h. m. s. | s. | ° ′ ″ | ″ |
| ζ Cygni . . . | 3 | 21 6 48.48 | + 2.550 | +29 38 18.0 | +14.53 |
| α Cephei . . | 3.2 | 21 15 8.32 | 1.439 | +61 58 35.0 | 15.10 |
| β Aquarii . . | 3 | 21 23 58.46 | 3.168 | — 6 12 8.2 | 15.61 |
| β Cephei . . | 3 | 21 26 47.08 | 0.805 | +69 55 44.4 | 15.69 |
| ε Pegasi . . . | 2.3 | 21 37 6.78 | 2.951 | + 9 13 0.5 | 16.30 |
| α Aquarii . . | 3 | 21 58 23.11 | + 3.085 | — 1 1 3.7 | +17.30 |
| α Gruis . . . | 2 | 21 59 8.22 | 3.821 | —47 39 20.3 | 17.15 |
| ζ Pegasi . . | 3.4 | 22 34 16.70 | 2.990 | +10 4 51.6 | 18.69 |
| α Pis. Aus. (*Fomalhaut*) | 1.2 | 22 49 41.01 | 3.334 | —30 23 3.8 | 18.97 |
| α Pegasi (*Markab*) . | 2 | 22 57 35.39 | 2.985 | +14 25 53.0 | 19.33 |
| ι Piscium . . | 4.5 | 23 32 32.70 | + 3.088 | + 4 50 46.5 | +19.47 |
| γ Cephei . . | 3.4 | 23 33 28.27 | + 2.396 | +76 49 43.8 | +20.09 |

## APPARENT PLACES OF α URSÆ MINORIS (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>1 6 | ° ′<br>88 32 | h. m.<br>1 5 | ° ′<br>88 32 | h. m.<br>1 5 | ° ′<br>88 32 | h. m.<br>1 5 | ° ′<br>88 32 | |
| | s. | ″ | s. | ″ | s. | ″ | s. | ″ | |
| 1 | 33.37 | 49.81 | 67.33 | 49.34 | 47.74 | 43.96 | 38.99 | 35.11 | 1 |
| 2 | 32.54 | 49.88 | 66.53 | 49.23 | 47.24 | 43.71 | 38.96 | 34.81 | 2 |
| 3 | 31.70 | 49.94 | 65.74 | 49.11 | 46.75 | 43.46 | 38.94 | 34.51 | 3 |
| 4 | 30.86 | 50.00 | 64.96 | 48.98 | 46.27 | 43.20 | 38.96 | 34.21 | 4 |
| 5 | 30.02 | 50.05 | 64.19 | 48.85 | 45.81 | 42.94 | 38.98 | 33.91 | 5 |
| 6 | 29.17 | 50.09 | 63.42 | 48.71 | 45.36 | 42.68 | 39.01 | 33.61 | 6 |
| 7 | 28.32 | 50.13 | 62.66 | 48.57 | 44.93 | 42.41 | 39.07 | 33.31 | 7 |
| 8 | 27.47 | 50.17 | 61.91 | 48.42 | 44.51 | 42.14 | 39.14 | 33.01 | 8 |
| 9 | 26.62 | 50.20 | 61.17 | 48.27 | 44.10 | 41.86 | 39.22 | 32.72 | 9 |
| 10 | 25.77 | 50.23 | 60.43 | 48.12 | 43.70 | 41.59 | 39.32 | 32.43 | 10 |
| 11 | 24.92 | 50.26 | 59.70 | 47.96 | 43.33 | 41.31 | 39.44 | 32.14 | 11 |
| 12 | 24.07 | 50.28 | 58.97 | 47.79 | 42.97 | 41.03 | 39.57 | 31.85 | 12 |
| 13 | 23.21 | 50.30 | 58.25 | 47.62 | 42.62 | 40.75 | 39.72 | 31.56 | 13 |
| 14 | 22.35 | 50.30 | 57.54 | 47.44 | 42.29 | 40.47 | 39.88 | 31.27 | 14 |
| 15 | 21.50 | 50.30 | 56.84 | 47.26 | 41.97 | 40.18 | 40.06 | 30.99 | 15 |
| 16 | 20.65 | 50.30 | 56.15 | 47.07 | 41.67 | 39.89 | 40.26 | 30.71 | 16 |
| 17 | 19.80 | 50.29 | 55.48 | 46.88 | 41.38 | 39.60 | 40.47 | 30.42 | 17 |
| 18 | 18.95 | 50.27 | 54.81 | 46.68 | 41.11 | 39.31 | 40.70 | 30.13 | 18 |
| 19 | 18.10 | 50.24 | 54.15 | 46.47 | 40.86 | 39.02 | 40.95 | 29.85 | 19 |
| 20 | 17.25 | 50.21 | 53.50 | 46.26 | 40.63 | 38.73 | 41.21 | 29.57 | 20 |
| 21 | 16.40 | 50.17 | 52.87 | 46.05 | 40.41 | 38.43 | 41.48 | 29.29 | 21 |
| 22 | 15.56 | 50.12 | 52.25 | 45.83 | 40.20 | 38.13 | 41.77 | 29.01 | 22 |
| 23 | 14.72 | 50.07 | 51.65 | 45.61 | 40.01 | 37.83 | 42.07 | 28.74 | 23 |
| 24 | 13.88 | 50.01 | 51.06 | 45.39 | 39.83 | 37.53 | 42.38 | 28.47 | 24 |
| 25 | 13.05 | 49.95 | 50.48 | 45.16 | 39.67 | 37.22 | 42.71 | 28.21 | 25 |
| 26 | 12.22 | 49.88 | 49.91 | 44.93 | 39.53 | 36.92 | 43.05 | 27.95 | 26 |
| 27 | 11.39 | 49.80 | 49.35 | 44.69 | 39.40 | 36.62 | 43.41 | 27.70 | 27 |
| 28 | 10.57 | 49.72 | 48.80 | 44.45 | 39.28 | 36.32 | 43.78 | 27.45 | 28 |
| 29 | 9.75 | 49.63 | 48.26 | 44.21 | 39.18 | 36.02 | 44.17 | 27.20 | 29 |
| 30 | 8.94 | 49.54 | 47.74 | 43.96 | 39.10 | 35.71 | 44.57 | 26.96 | 30 |
| 31 | 8.13 | 49.44 | . . | . . | 39.03 | 35.41 | 44.98 | 26.72 | 31 |
| 32 | 7.33 | 49.34 | . . | . . | 38.99 | 35.11 | 45.40 | 26.48 | 32 |

## APPARENT PLACES OF *a* URSÆ MINORIS (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | MAY. | | JUNE. | | JULY. | | AUGUST. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>1 5 | ° ′<br>88 32 | h. m.<br>1 6 | ° ′<br>88 32 | h. m.<br>1 6 | ° ′<br>88 32 | h. m.<br>1 6 | ° ′<br>88 32 | |
| | s | ″ | s | ″ | s. | ″ | s. | ″ | |
| 1 | 44.98 | 26.72 | 3.49 | 21.18 | 28.13 | 20.45 | 54.02 | 24.85 | 1 |
| 2 | 45.40 | 26.48 | 4.24 | 21.08 | 29.00 | 20.52 | 54.79 | 25.07 | 2 |
| 3 | 45.84 | 26.24 | 5.00 | 20.98 | 29.86 | 20.59 | 55.56 | 25.30 | 3 |
| 4 | 46.29 | 26.00 | 5.77 | 20.89 | 30.72 | 20.67 | 56.32 | 25.53 | 4 |
| 5 | 46.76 | 25.77 | 6.55 | 20.81 | 31.58 | 20.76 | 57.08 | 25.76 | 5 |
| 6 | 47.24 | 25.54 | 7.33 | 20.73 | 32.44 | 20.84 | 57.83 | 26.00 | 6 |
| 7 | 47.73 | 25.31 | 8.11 | 20.66 | 33.30 | 20.93 | 58.57 | 26.24 | 7 |
| 8 | 48.23 | 25.09 | 8.90 | 20.59 | 34.16 | 21.02 | 59.31 | 26.48 | 8 |
| 9 | 48.75 | 24.88 | 9.70 | 20.52 | 35.02 | 21.12 | 60.04 | 26.73 | 9 |
| 10 | 49.28 | 24.67 | 10.50 | 20.46 | 35.88 | 21.22 | 60.76 | 26.99 | 10 |
| 11 | 49.82 | 24.46 | 11.30 | 20.41 | 36.74 | 21.33 | 61.47 | 27.25 | 11 |
| 12 | 50.37 | 24.26 | 12.11 | 20.36 | 37.59 | 21.45 | 62.18 | 27.51 | 12 |
| 13 | 50.93 | 24.06 | 12.92 | 20.31 | 38.44 | 21.57 | 62.88 | 27.78 | 13 |
| 14 | 51.50 | 23.87 | 13.74 | 20.27 | 39.29 | 21.70 | 63.57 | 28.05 | 14 |
| 15 | 52.08 | 23.68 | 14.56 | 20.24 | 40.14 | 21.83 | 64.26 | 28.32 | 15 |
| 16 | 52.67 | 23.49 | 15.39 | 20.21 | 40.99 | 21.97 | 64.94 | 28.60 | 16 |
| 17 | 53.27 | 23.31 | 16.22 | 20.18 | 41.83 | 22.11 | 65.61 | 28.88 | 17 |
| 18 | 53.88 | 23.14 | 17.06 | 20.17 | 42.67 | 22.26 | 66.28 | 29.17 | 18 |
| 19 | 54.51 | 22.97 | 17.90 | 20.16 | 43.51 | 22.41 | 66.94 | 29.46 | 19 |
| 20 | 55.14 | 22.81 | 18.74 | 20.15 | 44.34 | 22.57 | 67.59 | 29.75 | 20 |
| 21 | 55.79 | 22.65 | 19.58 | 20.16 | 45.17 | 22.73 | 68.23 | 30.05 | 21 |
| 22 | 56.44 | 22.50 | 20.43 | 20.17 | 45.99 | 22.90 | 68.87 | 30.35 | 22 |
| 23 | 57.10 | 22.35 | 21.28 | 20.18 | 46.81 | 23.07 | 69.49 | 30.65 | 23 |
| 24 | 57.77 | 22.20 | 22.13 | 20.19 | 47.63 | 23.25 | 70.11 | 30.96 | 24 |
| 25 | 58.46 | 22.06 | 22.98 | 20.21 | 48.44 | 23.43 | 70.72 | 31.27 | 25 |
| 26 | 59.16 | 21.92 | 23.83 | 20.23 | 49.25 | 23.62 | 71.32 | 31.58 | 26 |
| 27 | 59.86 | 21.78 | 24.69 | 20.26 | 50.06 | 23.81 | 71.91 | 31.89 | 27 |
| 28 | 60.57 | 21.65 | 25.55 | 20.30 | 50.86 | 24.00 | 72.49 | 32.21 | 28 |
| 29 | 61.29 | 21.53 | 26.41 | 20.34 | 51.66 | 24.21 | 73.06 | 32.53 | 29 |
| 30 | 62.02 | 21.41 | 27.27 | 20.39 | 52.45 | 24.42 | 73.62 | 32.86 | 30 |
| 31 | 62.75 | 21.29 | 28.13 | 20.45 | 53.24 | 24.63 | 74.17 | 33.18 | 31 |
| 32 | 63.49 | 21.18 | 29.00 | 20.52 | 54.02 | 24.85 | 74.70 | 33.51 | 32 |

## APPARENT PLACES OF α URSÆ MINORIS (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>1 7 | ° ′<br>88 32 | h. m.<br>1 7 | ° ′<br>88 32 | h. m.<br>1 7 | ° ′<br>88 32 | h. m.<br>1 6 | ° ′<br>88 33 | |
| | s. | ″ | s. | ″ | s. | ″ | s. | ″ | |
| 1 | 14.70 | 33.51 | 25.84 | 44.42 | 25.68 | 56.22 | 73.60 | 5.83 | 1 |
| 2 | 15.22 | 33.84 | 26.03 | 44.80 | 25.46 | 56.59 | 72.01 | 6.09 | 2 |
| 3 | 15.74 | 34.18 | 26.21 | 45.19 | 25.23 | 56.95 | 72.41 | 6.35 | 3 |
| 4 | 16.25 | 34.52 | 26.37 | 45.57 | 24.98 | 57.31 | 71.80 | 6.60 | 4 |
| 5 | 16.75 | 34.86 | 26.53 | 45.96 | 24.72 | 57.66 | 71.18 | 6.85 | 5 |
| 6 | 17.24 | 35.20 | 26.67 | 46.35 | 24.45 | 58.01 | 70.55 | 7.09 | 6 |
| 7 | 17.72 | 35.55 | 26.79 | 46.74 | 24.17 | 58.36 | 69.90 | 7.33 | 7 |
| 8 | 18.19 | 35.90 | 26.90 | 47.13 | 23.87 | 58.71 | 69.25 | 7.57 | 8 |
| 9 | 18.65 | 36.25 | 27.01 | 47.52 | 23.56 | 59.06 | 68.59 | 7.80 | 9 |
| 10 | 19.10 | 36.60 | 27.10 | 47.91 | 23.24 | 59.41 | 67.93 | 8.01 | 10 |
| 11 | 19.54 | 36.96 | 27.17 | 48.29 | 22.90 | 59.75 | 67.25 | 8.22 | 11 |
| 12 | 19.96 | 37.31 | 27.23 | 48.68 | 22.55 | 60.09 | 66.56 | 8.42 | 12 |
| 13 | 20.37 | 37.67 | 27.28 | 49.06 | 22.19 | 60.43 | 65.86 | 8.62 | 13 |
| 14 | 20.78 | 38.03 | 27.31 | 49.45 | 21.82 | 60.76 | 65.15 | 8.81 | 14 |
| 15 | 21.17 | 38.40 | 27.34 | 49.83 | 21.44 | 61.09 | 64.43 | 9.00 | 15 |
| 16 | 21.55 | 38.77 | 27.36 | 50.21 | 21.05 | 61.41 | 63.70 | 9.18 | 16 |
| 17 | 21.92 | 39.14 | 27.35 | 50.59 | 20.64 | 61.73 | 62.97 | 9.36 | 17 |
| 18 | 22.28 | 39.51 | 27.33 | 50.96 | 20.22 | 62.05 | 62.23 | 9.54 | 18 |
| 19 | 22.63 | 39.88 | 27.31 | 51.33 | 19.78 | 62.36 | 61.48 | 9.71 | 19 |
| 20 | 22.97 | 40.25 | 27.26 | 51.70 | 19.33 | 62.67 | 60.73 | 9.88 | 20 |
| 21 | 23.29 | 40.62 | 27.20 | 52.07 | 18.87 | 62.98 | 59.97 | 10.04 | 21 |
| 22 | 23.60 | 40.99 | 27.13 | 52.45 | 18.40 | 63.28 | 59.20 | 10.20 | 22 |
| 23 | 23.90 | 41.37 | 27.04 | 52.82 | 17.91 | 63.58 | 58.42 | 10.35 | 23 |
| 24 | 24.19 | 41.75 | 26.94 | 53.20 | 17.41 | 63.87 | 57.64 | 10.50 | 24 |
| 25 | 24.46 | 42.13 | 26.83 | 53.58 | 16.90 | 64.16 | 56.85 | 10.65 | 25 |
| 26 | 24.72 | 42.51 | 26.71 | 53.97 | 16.38 | 64.45 | 56.05 | 10.79 | 26 |
| 27 | 24.97 | 42.89 | 26.58 | 54.35 | 15.85 | 64.73 | 55.25 | 10.93 | 27 |
| 28 | 25.21 | 43.27 | 26.43 | 54.73 | 15.31 | 65.01 | 54.45 | 11.07 | 28 |
| 29 | 25.43 | 43.65 | 26.26 | 55.11 | 14.75 | 65.29 | 53.64 | 11.19 | 29 |
| 30 | 25.64 | 44.03 | 26.08 | 55.49 | 14.18 | 65.56 | 52.83 | 11.29 | 30 |
| 31 | 25.84 | 44.42 | 25.89 | 55.86 | 13.60 | 65.83 | 52.02 | 11.38 | 31 |
| 32 | 26.03 | 44.80 | 25.68 | 56.22 | 13.01 | 66.09 | 51.21 | 11.45 | 32 |

## APPARENT PLACES OF δ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | JANUARY. | | FEBRUARY. | | MARCH. | | APRIL. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R.A | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>18 18 | ° ′<br>86 35 | h. m.<br>18 18 | ° ′<br>86 35 | h. m.<br>18 18 | ° ′<br>86 35 | h. m.<br>18 18 | ° ′<br>86 35 | |
| 1 | s.<br>27.35 | ″<br>50.70 | s.<br>30.00 | ″<br>40.58 | s.<br>37.67 | ″<br>34.23 | s.<br>48.38 | ″<br>32.83 | 1 |
| 2 | 27.34 | 50.35 | 30.20 | 40.30 | 37.99 | 34.09 | 48.73 | 32.89 | 2 |
| 3 | 27.33 | 50.00 | 30.40 | 40.02 | 38.31 | 33.96 | 49.07 | 32.95 | 3 |
| 4 | 27.32 | 49.65 | 30.60 | 39.74 | 38.64 | 33.83 | 49.41 | 33.02 | 4 |
| 5 | 27.31 | 49.30 | 30.81 | 39.47 | 38.97 | 33.71 | 49.75 | 33.10 | 5 |
| 6 | 27.31 | 48.96 | 31.03 | 39.21 | 39.30 | 33.60 | 50.09 | 33.19 | 6 |
| 7 | 27.33 | 48.62 | 31.25 | 38.95 | 39.64 | 33.50 | 50.43 | 33.28 | 7 |
| 8 | 27.35 | 48.27 | 31.48 | 38.69 | 39.98 | 33.41 | 50.77 | 33.37 | 8 |
| 9 | 27.37 | 47.93 | 31.71 | 38.44 | 40.32 | 33.32 | 51.10 | 33.47 | 9 |
| 10 | 27.40 | 47.59 | 31.94 | 38.19 | 40.66 | 33.24 | 51.43 | 33.58 | 10 |
| 11 | 27.44 | 47.25 | 32.19 | 37.94 | 41.01 | 33.16 | 51.76 | 33.70 | 11 |
| 12 | 27.50 | 46.91 | 32.44 | 37.70 | 41.36 | 33.09 | 52.08 | 33.82 | 12 |
| 13 | 27.56 | 46.58 | 32.69 | 37.46 | 41.71 | 33.03 | 52.40 | 33.94 | 13 |
| 14 | 27.63 | 46.24 | 32.95 | 37.22 | 42.06 | 32.98 | 52.72 | 34.07 | 14 |
| 15 | 27.70 | 45.91 | 33.21 | 36.99 | 42.41 | 32.94 | 53.03 | 34.20 | 15 |
| 16 | 27.78 | 45.57 | 33.48 | 36.76 | 42.76 | 32.91 | 53.34 | 34.34 | 16 |
| 17 | 27.88 | 45.24 | 33.76 | 36.54 | 43.11 | 32.87 | 53.64 | 34.48 | 17 |
| 18 | 27.98 | 44.91 | 34.04 | 36.33 | 43.46 | 32.83 | 53.95 | 34.63 | 18 |
| 19 | 28.08 | 44.58 | 34.32 | 36.12 | 43.81 | 32.79 | 54.26 | 34.88 | 19 |
| 20 | 28.18 | 44.26 | 34.60 | 35.92 | 44.16 | 32.75 | 54.57 | 34.94 | 20 |
| 21 | 28.28 | 43.93 | 34.89 | 35.72 | 44.51 | 32.71 | 54.86 | 35.11 | 21 |
| 22 | 28.41 | 43.61 | 35.19 | 35.52 | 44.86 | 32.70 | 55.15 | 35.28 | 22 |
| 23 | 28.55 | 43.29 | 35.49 | 35.33 | 45.21 | 32.69 | 55.44 | 35.46 | 23 |
| 24 | 28.69 | 42.98 | 35.79 | 35.16 | 45.56 | 32.68 | 55.73 | 35.64 | 24 |
| 25 | 28.83 | 42.67 | 36.09 | 35.00 | 45.92 | 32.67 | 56.01 | 35.82 | 25 |
| 26 | 28.97 | 42.36 | 36.40 | 34.83 | 46.28 | 32.66 | 56.28 | 36.02 | 26 |
| 27 | 29.13 | 42.06 | 36.71 | 34.67 | 46.63 | 32.68 | 56.55 | 36.22 | 27 |
| 28 | 29.29 | 41.76 | 37.03 | 34.51 | 46.98 | 32.70 | 56.81 | 36.42 | 28 |
| 29 | 29.46 | 41.46 | 37.35 | 34.36 | 47.73 | 32.73 | 57.07 | 36.62 | 29 |
| 30 | 29.63 | 41.16 | 37.67 | 34.23 | 47.68 | 32.76 | 57.33 | 36.82 | 30 |
| 31 | 29.81 | 40.87 | . . | . . | 48.03 | 32 79 | 57.58 | 37.04 | 31 |
| 32 | 30.00 | 40.58 | . . | . . | 48.38 | 32.83 | . . | . . | 32 |

## APPARENT PLACES OF δ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | MAY. | | JUNE. | | JULY. | | AUGUST. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>18 18 | ° ′<br>86 35 | h. m.<br>18 19 | ° ′<br>86 35 | h. m.<br>18 18 | ° ′<br>86 35 | h. m.<br>18 18 | ° ′<br>86 36 | |
| | s. | ″ | s. | ″ | s. | ″ | s. | ″ | |
| 1 | 57.58 | 37.04 | 2.75 | 45.36 | 62.18 | 54.89 | 55.80 | 3.75 | 1 |
| 2 | 57.82 | 37.26 | 2.82 | 45.67 | 62.06 | 55.20 | 55.52 | 4.00 | 2 |
| 3 | 58.06 | 37.48 | 2.89 | 45.98 | 61.93 | 55.52 | 55.24 | 4.25 | 3 |
| 4 | 58.30 | 37.70 | 2.96 | 46.29 | 61.80 | 55.84 | 54.94 | 4.49 | 4 |
| 5 | 58.54 | 37.93 | 3.01 | 46.60 | 61.66 | 56.15 | 54.64 | 4.72 | 5 |
| 6 | 58.76 | 38.17 | 3.06 | 46.91 | 61.51 | 56.46 | 54.34 | 4.95 | 6 |
| 7 | 58.98 | 38.41 | 3.10 | 47.23 | 61.36 | 56.77 | 54.04 | 5.18 | 7 |
| 8 | 59.20 | 38.65 | 3.13 | 47.55 | 61.20 | 57.08 | 53.74 | 5.41 | 8 |
| 9 | 59.41 | 38.89 | 3.14 | 47.87 | 61.04 | 57.38 | 53.43 | 5.63 | 9 |
| 10 | 59.62 | 39.13 | 3.15 | 48.18 | 60.87 | 57.68 | 53.11 | 5.84 | 10 |
| 11 | 59.82 | 39.38 | 3.16 | 48.50 | 60.70 | 57.98 | 52.78 | 6.05 | 11 |
| 12 | 60.02 | 39.63 | 3.17 | 48.82 | 60.53 | 58.28 | 52.45 | 6.26 | 12 |
| 13 | 60.21 | 39.89 | 3.18 | 49.14 | 60.35 | 58.58 | 52.11 | 6.46 | 13 |
| 14 | 60.40 | 40.15 | 3.18 | 49.46 | 60.17 | 58.88 | 51.76 | 6.66 | 14 |
| 15 | 60.59 | 40.41 | 3.17 | 49.78 | 59.98 | 59.17 | 51.41 | 6.86 | 15 |
| 16 | 60.76 | 40.68 | 3.16 | 50.10 | 59.78 | 59.46 | 51.06 | 7.06 | 16 |
| 17 | 60.92 | 40.96 | 3.14 | 50.42 | 59.58 | 59.75 | 50.71 | 7.26 | 17 |
| 18 | 61.08 | 41.24 | 3.12 | 50.74 | 59.38 | 60.03 | 50.35 | 7.46 | 18 |
| 19 | 61.24 | 41.52 | 3.10 | 51.07 | 59.18 | 60.31 | 49.98 | 7.64 | 19 |
| 20 | 61.40 | 41.80 | 3.07 | 51.39 | 58.96 | 60.58 | 49.61 | 7.82 | 20 |
| 21 | 61.55 | 42.09 | 3.03 | 51.71 | 58.73 | 60.86 | 49.24 | 7.99 | 21 |
| 22 | 61.69 | 42.38 | 2.97 | 52.03 | 58.49 | 61.14 | 48.87 | 8.16 | 22 |
| 23 | 61.82 | 42.67 | 2.90 | 52.35 | 58.25 | 61.42 | 48.50 | 8.33 | 23 |
| 24 | 61.95 | 42.96 | 2.82 | 52.67 | 58.00 | 61.70 | 48.12 | 8.49 | 24 |
| 25 | 62.08 | 43.25 | 2.74 | 52.89 | 57.74 | 61.97 | 47.73 | 8.64 | 25 |
| 26 | 62.20 | 43.54 | 2.66 | 53.21 | 57.47 | 62.23 | 47.34 | 8.80 | 26 |
| 27 | 62.31 | 43.84 | 2.57 | 53.53 | 57.20 | 62.49 | 46.94 | 8.96 | 27 |
| 28 | 62.41 | 44.14 | 2.48 | 53.85 | 56.93 | 62.75 | 46.54 | 9.12 | 28 |
| 29 | 62.51 | 44.44 | 2.39 | 54.27 | 56.66 | 63.00 | 46.14 | 9.27 | 29 |
| 30 | 62.60 | 44.74 | 2.29 | 54.58 | 56.38 | 63.25 | 45.74 | 9.32 | 30 |
| 31 | 62.68 | 45.05 | 2.18 | 54.89 | 56.09 | 63.50 | 45.34 | 9.47 | 31 |
| 32 | 62.75 | 45.36 | . . | . . | 55.80 | 63.75 | 44.95 | 9.62 | 32 |

## APPARENT PLACES OF δ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Day of the Month. | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | | Day of the Month. |
|---|---|---|---|---|---|---|---|---|---|
| | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | R.A. | Dec. *North.* | |
| | h. m.<br>18 18 | ° ′<br>86 36 | h. m.<br>18 18 | ° ′<br>86 36 | h. m.<br>18 18 | ° ′<br>86 36 | h. m.<br>18 18 | ° ′<br>86 35 | |
| | s. | ″ | s. | ″ | s. | ″ | s. | ″ | |
| 1 | 44.95 | 9.62 | 32.35 | 11.39 | 19.47 | 8.49 | 9.98 | 61.48 | 1 |
| 2 | 44.56 | 9.79 | 31.93 | 11.38 | 19.09 | 8.31 | 9.74 | 61.19 | 2 |
| 3 | 44.16 | 9.94 | 31.50 | 11.35 | 18.71 | 8.13 | 9.51 | 60.89 | 3 |
| 4 | 43.76 | 10.08 | 31.07 | 11.32 | 18.33 | 7.95 | 9.29 | 60.59 | 4 |
| 5 | 43.35 | 10.21 | 30.64 | 11.29 | 17.96 | 7.77 | 9.07 | 60.29 | 5 |
| 6 | 42.94 | 10.33 | 30.20 | 11.26 | 17.59 | 7.59 | 8.86 | 59.99 | 6 |
| 7 | 42.53 | 10.44 | 29.76 | 11.21 | 17.23 | 7.39 | 8.66 | 59.68 | 7 |
| 8 | 42.12 | 10.54 | 29.33 | 11.15 | 16.87 | 7.18 | 8.47 | 59.37 | 8 |
| 9 | 41.71 | 10.64 | 28.90 | 11.09 | 16.51 | 6.97 | 8.28 | 59.06 | 9 |
| 10 | 41.31 | 10.74 | 28.47 | 11.03 | 16.16 | 6.76 | 8.09 | 58.75 | 10 |
| 11 | 40.90 | 10.84 | 28.04 | 10.97 | 15.81 | 6.55 | 7.91 | 58.44 | 11 |
| 12 | 40.48 | 10.92 | 27.61 | 10.91 | 15.47 | 6.34 | 7.74 | 58.12 | 12 |
| 13 | 40.06 | 10.99 | 27.18 | 10.84 | 15.13 | 6.13 | 7.58 | 57.80 | 13 |
| 14 | 39.64 | 11.05 | 26.75 | 10.77 | 14.80 | 5.91 | 7.42 | 57.48 | 14 |
| 15 | 39.22 | 11.11 | 26.33 | 10.69 | 14.47 | 5.69 | 7.26 | 57.16 | 15 |
| 16 | 38.80 | 11.17 | 25.91 | 10.60 | 14.14 | 5.47 | 7.10 | 56.83 | 16 |
| 17 | 38.38 | 11.23 | 25.49 | 10.50 | 13.83 | 5.22 | 6.97 | 56.50 | 17 |
| 18 | 38.96 | 11.28 | 25.08 | 10.40 | 13.52 | 4.97 | 6.85 | 56.17 | 18 |
| 19 | 38.54 | 11.33 | 24.67 | 10.29 | 13.22 | 4.72 | 6.73 | 55.84 | 19 |
| 20 | 38.12 | 11.37 | 24.26 | 10.18 | 12.92 | 4.57 | 6.61 | 55.51 | 20 |
| 21 | 37.70 | 11.39 | 23.85 | 10.07 | 12.62 | 4.22 | 6.49 | 55.18 | 21 |
| 22 | 36.28 | 11.40 | 23.44 | 9.96 | 12.34 | 3.96 | 6.38 | 54.85 | 22 |
| 23 | 35.86 | 11.40 | 23.03 | 9.83 | 12.06 | 3.70 | 6.28 | 54.51 | 23 |
| 24 | 35.43 | 11.40 | 22.62 | 9.69 | 11.78 | 3.43 | 6.19 | 54.17 | 24 |
| 25 | 35.00 | 11.40 | 22.22 | 9.55 | 11.50 | 3.16 | 6.11 | 53.83 | 25 |
| 26 | 34.56 | 11.41 | 21.82 | 9.41 | 11.23 | 2.89 | 6.04 | 53.49 | 26 |
| 27 | 34.11 | 11.42 | 21.42 | 9.27 | 10.98 | 2.61 | 5.98 | 53.15 | 27 |
| 28 | 33.66 | 11.42 | 21.03 | 9.12 | 10.73 | 2.33 | 5.93 | 52.81 | 28 |
| 29 | 33.22 | 11.41 | 20.64 | 8.97 | 10.48 | 2.05 | 5.88 | 52.47 | 29 |
| 30 | 32.78 | 11.40 | 20.25 | 8.82 | 10.23 | 1.77 | 5.83 | 52.13 | 30 |
| 31 | 32.35 | 11.39 | 19.86 | 8.66 | 9.98 | 1.48 | 5.78 | 51.79 | 31 |
| 32 | . . | . . | 19.47 | 8.49 | . . | . . | 5.73 | 41.45 | 32 |

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α ANDROMEDÆ. | | | | γ PEGASI. (*Algenib.*) | | | | β Hydræ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | |
| | h. m.<br>0 0 | | ° ′<br>28 17 | | h. m.<br>0 5 | | ° ′<br>14 22 | | h. m.<br>0 18 | | ° ′<br>78 3 | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 56.07 | 0.12 | 48.4 | 0.9 | 48.66 | 0.10 | 58.6 | 0.8 | 8.32 | 0.89 | 80.7 | 1.1 |
| 11 | 55.95 | 0.12 | 47.5 | 1.2 | 48.56 | 0.10 | 57.8 | 0.8 | 7.43 | 0.83 | 79.6 | 1.7 |
| 21 | 55.83 | 0.11 | 46.3 | 1.3 | 48.46 | 0.08 | 57.0 | 0.9 | 6.60 | 0.74 | 77.9 | 2.2 |
| 31 | 55.72 | 0.08 | 45.0 | 1.5 | 48.38 | 0.07 | 56.1 | 1.0 | 5.86 | 0.64 | 75.7 | 2.6 |
| Feb. 10 | 55.64 | 0.07 | 43.5 | 1.5 | 48.31 | 0.06 | 55.1 | 0.9 | 5.22 | 0.51 | 73.1 | 3.1 |
| 20 | 55.57 | 0.04 | 42.0 | 1.5 | 48.25 | 0.03 | 54.2 | 0.9 | 4.71 | 0.38 | 70.0 | 3.4 |
| March 1 | 55.53 | 0.00 | 40.5 | 1.5 | 48.22 | 0.00 | 53.3 | 0.7 | 4.33 | 0.23 | 66.6 | 3.6 |
| 11 | 55.53 | 0.05 | 39.0 | 1.4 | 48.22 | 0.05 | 52.6 | 0.4 | 4.10 | 0.07 | 63.0 | 3.8 |
| 21 | 55.58 | 0.09 | 37.6 | 1.2 | 48.27 | 0.08 | 52.2 | 0.3 | 4.03 | 0.08 | 59.2 | 3.9 |
| 31 | 55.67 | 0.13 | 36.4 | 0.9 | 48.35 | 0.12 | 51.9 | 0.3 | 4.11 | 0.24 | 55.3 | 3.9 |
| April 10 | 55.80 | 0.18 | 35.5 | 0.4 | 48.47 | 0.17 | 51.6 | 0.3 | 4.35 | 0.39 | 51.4 | 3.8 |
| 20 | 55.98 | 0.22 | 35.1 | 0.0 | 48.64 | 0.21 | 51.9 | 0.6 | 4.74 | 0.54 | 47.6 | 3.7 |
| 30 | 56.20 | 0.26 | 35.1 | 0.1 | 48.85 | 0.25 | 52.5 | 1.0 | 5.28 | 0.69 | 43.9 | 3.4 |
| May 10 | 56.46 | 0.29 | 35.2 | 0.6 | 49.10 | 0.28 | 53.5 | 1.3 | 5.97 | 0.82 | 40.5 | 3.1 |
| 20 | 56.75 | 0.32 | 35.8 | 1.0 | 49.38 | 0.30 | 54.8 | 1.5 | 6.79 | 0.92 | 37.4 | 2.7 |
| 30 | 57.07 | 0.34 | 36.8 | 1.4 | 49.68 | 0.32 | 56.3 | 1.7 | 7.71 | 1.02 | 34.7 | 2.3 |
| June 9 | 57.41 | 0.35 | 38.2 | 1.8 | 50.00 | 0.33 | 58.0 | 2.0 | 8.73 | 1.09 | 32.4 | 1.8 |
| 19 | 57.76 | 0.35 | 40.0 | 2.0 | 50.33 | 0.33 | 60.0 | 2.1 | 9.82 | 1.13 | 30.6 | 1.2 |
| 29 | 58.11 | 0.34 | 42.0 | 2.3 | 50.66 | 0.32 | 62.1 | 2.2 | 10.95 | 1.15 | 29.4 | 0.6 |
| July 9 | 58.45 | 0.32 | 44.3 | 2.5 | 50.98 | 0.31 | 64.3 | 2.2 | 12.10 | 1.12 | 28.8 | 0.0 |
| 19 | 58.77 | 0.30 | 46.8 | 2.5 | 51.29 | 0.29 | 66.5 | 2.2 | 13.22 | 1.07 | 28.8 | 0.6 |
| 29 | 59.07 | 0.27 | 49.3 | 2.6 | 51.58 | 0.25 | 68.7 | 2.2 | 14.29 | 0.99 | 29.4 | 1.2 |
| Aug. 8 | 59.34 | 0.24 | 51.9 | 2.7 | 51.83 | 0.22 | 70.9 | 2.0 | 15.28 | 0.88 | 30.6 | 1.7 |
| 18 | 59.58 | 0.19 | 54.6 | 2.6 | 52.05 | 0.19 | 72.9 | 1.9 | 16.16 | 0.75 | 32.3 | 2.2 |
| 28 | 59.77 | 0.15 | 57.2 | 2.4 | 52.24 | 0.15 | 74.8 | 1.7 | 16.91 | 0.56 | 34.5 | 2.5 |
| Sept. 7 | 59.92 | 0.12 | 59.6 | 2.3 | 52.39 | 0.11 | 76.5 | 1.6 | 17.47 | 0.41 | 37.0 | 2.7 |
| 17 | 60.04 | 0.08 | 61.9 | 2.1 | 52.50 | 0.07 | 78.1 | 1.3 | 17.88 | 0.20 | 39.7 | 3.0 |
| 27 | 60.12 | 0.03 | 64.0 | 1.8 | 52.57 | 0.03 | 79.4 | 1.1 | 18.08 | 0.01 | 42.7 | 3.1 |
| Oct. 7 | 60.15 | 0.01 | 65.8 | 1.6 | 52.60 | 0.00 | 80.5 | 0.8 | 18.07 | 0.15 | 45.8 | 2.9 |
| 17 | 60.14 | 0.02 | 67.4 | 1.4 | 52.60 | 0.02 | 81.3 | 0.6 | 17.92 | 0.39 | 48.7 | 2.8 |
| 27 | 60.12 | 0.05 | 68.8 | 1.1 | 52.58 | 0.03 | 81.9 | 0.4 | 17.53 | 0.54 | 51.5 | 2.4 |
| Nov. 6 | 60.07 | 0.08 | 69.9 | 0.8 | 52.55 | 0.06 | 82.3 | 0.2 | 16.99 | 0.68 | 53.9 | 2.0 |
| 16 | 59.99 | 0.10 | 70.7 | 0.5 | 52.49 | 0.07 | 82.5 | 0.1 | 16.31 | 0.79 | 55.9 | 1.5 |
| 26 | 59.89 | 0.11 | 71.2 | 0.2 | 52.42 | 0.09 | 82.4 | 0.2 | 15.52 | 0.87 | 57.4 | 1.0 |
| Dec. 6 | 59.78 | 0.12 | 71.4 | 0.1 | 52.33 | 0.10 | 82.2 | 0.3 | 14.65 | 0.92 | 58.4 | 0.4 |
| 16 | 59.66 | 0.13 | 71.3 | 0.4 | 52.23 | 0.11 | 81.9 | 0.6 | 13.73 | 0.94 | 58.8 | 0.2 |
| 26 | 59.53 | 0.12 | 70.9 | 0.7 | 52.12 | 0.10 | 81.3 | 0.7 | 12.79 | 0.92 | 58.6 | 0.7 |
| 36 | 59.41 | | 70.2 | | 52.02 | | 80.6 | | 11.87 | | 57.9 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α CASSIOPEÆ. | | | | β Ceti. | | | | θ¹ Ceti. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 0 | m. 32 | ° 55 | ' 44 | h. 0 | m. 36 | ° 18 | ' 46 | h. 1 | m. 16 | ° 8 | ' 55 |
| | s. | s. | " | " | s. | s. | " | " | s. | s. | " | " |
| Jan. 1 | 20.36 | 0.26 | 63.0 | 0.8 | 21.19 | 0.12 | 50.1 | 0.4 | 49.44 | 0.10 | 45.0 | 0.6 |
| 11 | 20.10 | 0.27 | 62.7 | 0.8 | 21.07 | 0.11 | 50.5 | 0.1 | 49.34 | 0.12 | 45.6 | 0.4 |
| 21 | 19.83 | 0.24 | 61.9 | 1.3 | 20.96 | 0.10 | 50.6 | 0.1 | 49.22 | 0.11 | 46.0 | 0.2 |
| 31 | 19.59 | 0.22 | 60.6 | 1.9 | 20.86 | 0.09 | 50.5 | 0.4 | 49.11 | 0.11 | 46.2 | 0.2 |
| Feb. 10 | 19.37 | 0.19 | 58.7 | 2.3 | 20.77 | 0.07 | 50.1 | 0.6 | 49.00 | 0.10 | 46.4 | 0.2 |
| 20 | 19.18 | 0.15 | 56.4 | 2.5 | 20.70 | 0.05 | 49.5 | 0.9 | 48.90 | 0.08 | 46.2 | 0.2 |
| March 1 | 19.03 | 0.08 | 53.9 | 2.6 | 20.65 | 0.03 | 48.6 | 1.1 | 48.82 | 0.06 | 46.0 | 0.5 |
| 11 | 18.95 | 0.02 | 51.3 | 2.7 | 20.62 | 0.01 | 47.5 | 1.4 | 48.76 | 0.03 | 45.5 | 0.8 |
| 21 | 18.93 | 0.05 | 48.6 | 2.5 | 20.63 | 0.06 | 46.1 | 1.6 | 48.73 | 0.00 | 44.7 | 1.1 |
| 31 | 18.98 | 0.12 | 46.1 | 2.4 | 20.69 | 0.08 | 44.5 | 1.9 | 48.73 | 0.05 | 43.6 | 1.3 |
| April 10 | 19.10 | 0.20 | 43.7 | 2.1 | 20.77 | 0.13 | 42.6 | 2.1 | 48.78 | 0.09 | 42.3 | 1.4 |
| 20 | 19.30 | 0.25 | 41.6 | 1.7 | 20.90 | 0.17 | 40.5 | 2.2 | 48.87 | 0.13 | 40.9 | 1.7 |
| 30 | 19.56 | 0.31 | 39.9 | 1.3 | 21.07 | 0.21 | 38.3 | 2.4 | 49.00 | 0.17 | 39.2 | 1.9 |
| May 10 | 19.87 | 0.38 | 38.6 | 0.7 | 21.28 | 0.24 | 35.9 | 2.4 | 49.17 | 0.21 | 37.3 | 2.1 |
| 20 | 20.25 | 0.43 | 37.9 | 0.2 | 21.52 | 0.28 | 33.5 | 2.5 | 49.38 | 0.25 | 35.2 | 2.2 |
| 30 | 20.68 | 0.45 | 37.7 | 0.4 | 21.80 | 0.30 | 31.0 | 2.5 | 49.63 | 0.27 | 33.0 | 2.3 |
| June 9 | 21.13 | 0.47 | 38.1 | 1.0 | 22.10 | 0.32 | 28.5 | 2.4 | 49.90 | 0.30 | 30.7 | 2.4 |
| 19 | 21.60 | 0.47 | 39.1 | 1.5 | 22.42 | 0.34 | 26.1 | 2.2 | 50.20 | 0.31 | 28.3 | 2.2 |
| 29 | 22.07 | 0.48 | 40.6 | 2.0 | 22.76 | 0.33 | 23.9 | 2.0 | 50.51 | 0.32 | 26.1 | 2.1 |
| July 9 | 22.55 | 0.46 | 42.6 | 2.4 | 23.09 | 0.32 | 21.9 | 1.7 | 50.83 | 0.32 | 24.0 | 2.0 |
| 19 | 23.01 | 0.43 | 45.0 | 2.9 | 23.41 | 0.31 | 20.2 | 1.4 | 51.15 | 0.31 | 22.0 | 1.7 |
| 29 | 23.44 | 0.39 | 47.9 | 3.1 | 23.72 | 0.30 | 18.8 | 1.0 | 51.46 | 0.30 | 20.3 | 1.5 |
| Aug. 8 | 23.83 | 0.35 | 51.0 | 3.2 | 24.02 | 0.26 | 17.8 | 0.7 | 51.76 | 0.27 | 18.8 | 1.2 |
| 18 | 24.18 | 0.29 | 54.2 | 3.5 | 24.28 | 0.23 | 17.1 | 0.3 | 52.03 | 0.25 | 17.6 | 0.8 |
| 28 | 24.47 | 0.25 | 57.7 | 3.7 | 24.51 | 0.19 | 16.8 | 0.1 | 52.28 | 0.21 | 16.8 | 0.5 |
| Sept. 7 | 24.72 | 0.20 | 61.4 | 3.5 | 24.70 | 0.15 | 16.9 | 0.4 | 52.49 | 0.18 | 16.3 | 0.2 |
| 17 | 24.92 | 0.13 | 64.9 | 3.4 | 24.85 | 0.11 | 17.3 | 0.7 | 52.67 | 0.16 | 16.1 | 0.2 |
| 27 | 25.05 | 0.08 | 68.3 | 3.3 | 24.96 | 0.08 | 18.0 | 0.9 | 52.83 | 0.11 | 16.3 | 0.3 |
| Oct. 7 | 25.13 | 0.02 | 71.6 | 3.1 | 25.04 | 0.03 | 18.9 | 1.1 | 52.94 | 0.08 | 16.6 | 0.5 |
| 17 | 25.15 | 0.02 | 74.7 | 2.9 | 25.07 | 0.00 | 20.0 | 1.2 | 53.02 | 0.05 | 17.1 | 0.8 |
| 27 | 25.13 | 0.06 | 77.6 | 2.6 | 25.07 | 0.03 | 21.2 | 1.3 | 53.07 | 0.01 | 17.9 | 0.9 |
| Nov. 6 | 25.07 | 0.11 | 80.2 | 2.1 | 25.04 | 0.05 | 22.5 | 1.2 | 53.08 | 0.01 | 18.8 | 1.0 |
| 16 | 24.96 | 0.15 | 82.3 | 1.6 | 24.99 | 0.07 | 23.7 | 1.1 | 53.07 | 0.02 | 19.8 | 1.0 |
| 26 | 24.81 | 0.20 | 83.9 | 1.2 | 24.92 | 0.09 | 24.8 | 1.1 | 53.05 | 0.06 | 20.8 | 0.9 |
| Dec. 6 | 24.61 | 0.23 | 85.1 | 0.7 | 24.83 | 0.10 | 25.9 | 0.9 | 52.99 | 0.07 | 21.7 | 0.9 |
| 16 | 24.38 | 0.24 | 85.8 | 0.3 | 24.73 | 0.10 | 26.8 | 0.7 | 52.92 | 0.09 | 22.6 | 0.8 |
| 26 | 24.14 | 0.25 | 86.1 | 0.3 | 24.63 | 0.11 | 27.5 | 0.5 | 52.83 | 0.10 | 23.4 | 0.7 |
| 36 | 23.89 | | 85.8 | | 24.52 | | 28.0 | | 52.73 | | 24.1 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Eridani. (*Achernar.*) | | | | α Arietis. | | | | γ Ceti. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. m. 1 32 | | ° ′ 57 57 | | h. m. 1 59 | | ° ′ 22 46 | | h. m. 2 35 | | ° ′ 2 37 | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 21.71 | 0.31 | 87.2 | 0.3 | 3.63 | 0.11 | 52.8 | 0.2 | 50.71 | 0.10 | 36.7 | 0.7 |
| 11 | 21.40 | 0.32 | 87.5 | 0.3 | 3.52 | 0.12 | 52.6 | 0.4 | 50.61 | 0.11 | 36.0 | 0.5 |
| 21 | 21.08 | 0.32 | 87.2 | 0.8 | 3.40 | 0.13 | 52.2 | 0.6 | 50.50 | 0.12 | 35.5 | 0.5 |
| 31 | 20.76 | 0.30 | 86.4 | 1.4 | 3.27 | 0.15 | 51.6 | 0.7 | 50.38 | 0.13 | 35.0 | 0.4 |
| Feb. 10 | 20.46 | 0.27 | 85.0 | 1.8 | 3.12 | 0.13 | 50.9 | 0.7 | 50.25 | 0.13 | 34.6 | 0.3 |
| 20 | 20.19 | 0.25 | 83.2 | 2.3 | 2.99 | 0.12 | 50.2 | 0.8 | 50.12 | 0.13 | 34.3 | 0.2 |
| March 1 | 19.94 | 0.20 | 80.9 | 2.6 | 2.87 | 0.10 | 49.4 | 0.8 | 49.99 | 0.11 | 34.1 | 0.0 |
| 11 | 19.74 | 0.15 | 78.3 | 3.0 | 2.77 | 0.07 | 48.6 | 0.9 | 49.88 | 0.09 | 34.1 | 0.1 |
| 21 | 19.59 | 0.08 | 75.3 | 3.4 | 2.70 | 0.03 | 47.7 | 0.8 | 49.79 | 0.06 | 34.2 | 0.3 |
| 31 | 19.51 | 0.03 | 71.9 | 3.5 | 2.67 | 0.00 | 46.9 | 0.5 | 49.73 | 0.04 | 34.5 | 0.5 |
| April 10 | 19.48 | 0.05 | 68.4 | 3.8 | 2.67 | 0.06 | 46.4 | 0.4 | 49.69 | 0.01 | 35.0 | 0.7 |
| 20 | 19.53 | 0.11 | 64.6 | 3.7 | 2.73 | 0.10 | 46.0 | 0.3 | 49.70 | 0.06 | 35.7 | 0.9 |
| 30 | 19.64 | 0.18 | 60.9 | 3.8 | 2.83 | 0 16 | 45.7 | 0.0 | 49.76 | 0.10 | 36.6 | 1.1 |
| May 10 | 19.82 | 0.24 | 57.1 | 3.5 | 2.99 | 0.19 | 45.7 | 0.3 | 49.86 | 0.14 | 37.7 | 1.4 |
| 20 | 20.06 | 0.32 | 53.6 | 3.3 | 3.18 | 0.24 | 46.0 | 0.5 | 50.00 | 0.19 | 39.1 | 1.6 |
| 30 | 20.38 | 0.37 | 50.3 | 3.1 | 3.42 | 0.27 | 46.5 | 0.9 | 50.19 | 0.23 | 40.7 | 1.7 |
| June 9 | 20.75 | 0.42 | 47.2 | 2.8 | 3.69 | 0.30 | 47.4 | 1.2 | 50.42 | 0.25 | 42.4 | 1.9 |
| 19 | 21.17 | 0.45 | 44.4 | 2.3 | 3.99 | 0.33 | 48.6 | 1.4 | 50.67 | 0.28 | 44.3 | 1.9 |
| 29 | 21.62 | 0.48 | 42.1 | 1.9 | 4.32 | 0.33 | 50.0 | 1.6 | 50.95 | 0.30 | 46.2 | 1.9 |
| July 9 | 22.10 | 0.48 | 40.2 | 1.4 | 4.65 | 0.35 | 51.6 | 1.7 | 51.25 | 0.31 | 48.1 | 1.9 |
| 19 | 22.58 | 0.49 | 38.8 | 0.8 | 5.00 | 0.33 | 53.3 | 1.9 | 51.56 | 0.32 | 50.0 | 1.8 |
| 29 | 23.07 | 0.48 | 38.0 | 0.2 | 5.33 | 0.33 | 55.2 | 1.9 | 51.88 | 0.31 | 51.8 | 1.7 |
| Aug. 8 | 23.55 | 0.45 | 37.8 | 0.4 | 5.66 | 0.31 | 57.1 | 1.9 | 52.19 | 0.30 | 53.5 | 1.5 |
| 18 | 24.00 | 0.41 | 38.2 | 1.0 | 5.97 | 0.29 | 59.0 | 1.9 | 52.49 | 0.29 | 55.0 | 1.3 |
| 28 | 24.41 | 0.35 | 39.2 | 1.5 | 6.26 | 0.26 | 60.9 | 1.8 | 52.78 | 0.27 | 56.3 | 1.0 |
| Sept. 7 | 24.76 | 0.30 | 40.7 | 2.0 | 6.52 | 0.24 | 62.7 | 1.7 | 53.05 | 0.24 | 57.3 | 0.7 |
| 17 | 25.06 | 0.23 | 42.7 | 2.4 | 6.76 | 0.20 | 64.4 | 1.6 | 53.29 | 0.22 | 58.0 | 0.4 |
| 27 | 25.29 | 0.17 | 45.1 | 2.6 | 6.96 | 0.16 | 66.0 | 1.4 | 53.51 | 0.18 | 58.4 | 0.3 |
| Oct. 7 | 25.46 | 0.09 | 47.7 | 2.8 | 7.12 | 0.13 | 67.4 | 1.2 | 53.69 | 0.16 | 58.7 | 0.1 |
| 17 | 25.55 | 0.01 | 50.5 | 2.9 | 7.25 | 0.10 | 68.6 | 1.1 | 53.85 | 0.14 | 58.6 | 0.2 |
| 27 | 25.56 | 0.04 | 53.4 | 2.8 | 7.35 | 0.08 | 69.7 | 0.9 | 53.99 | 0.10 | 58.4 | 0.4 |
| Nov. 6 | 25.52 | 0.11 | 56.2 | 2.6 | 7.43 | 0.06 | 70.6 | 0.7 | 54.09 | 0.08 | 58.0 | 0.5 |
| 16 | 25.41 | 0.17 | 58.8 | 2.4 | 7.49 | 0.02 | 71.3 | 0.6 | 54.17 | 0.04 | 57.5 | 0.6 |
| 26 | 25.24 | 0.21 | 61.2 | 2.0 | 7.51 | 0.02 | 71.9 | 0.4 | 54.21 | 0.01 | 56.9 | 0.6 |
| Dec. 6 | 25.03 | 0.26 | 63.2 | 1.6 | 7.49 | 0.04 | 72.3 | 0.1 | 54.22 | 0.01 | 56.3 | 0.7 |
| 16 | 24.77 | 0.29 | 64.8 | 1.1 | 7.45 | 0.07 | 72.4 | 0.1 | 54.21 | 0.04 | 55.6 | 0.7 |
| 26 | 24.48 | 0.30 | 65.9 | 0.6 | 7.38 | 0.09 | 72.5 | 0.1 | 54.17 | 0.07 | 54.9 | 0.7 |
| 36 | 24.18 | | 66.5 | | 7.29 | | 72.4 | | 54.10 | | 54.2 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Ceti. | | | | α Persei. | | | | η Tauri. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 2 | m. 54 | ° 3 | ′ 31 | h. 3 | m. 14 | ° 49 | ′ 20 | h. 3 | m. 38 | ° 23 | ′ 39 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 45.54 | 0.07 | 21.6 | 0.6 | 4.03 | 0.13 | 54.8 | 1.0 | 56.22 | 0.05 | 31.3 | 0.1 |
| 11 | 45.47 | 0.10 | 21.0 | 0.5 | 3.90 | 0.17 | 55.8 | 0.7 | 56.17 | 0.10 | 31.4 | 0.1 |
| 21 | 45.37 | 0.12 | 20.5 | 0.5 | 3.73 | 0.21 | 56.5 | 0.3 | 56.07 | 0.12 | 31.5 | 0.2 |
| 31 | 45.25 | 0.13 | 20.0 | 0.4 | 3.52 | 0.24 | 56.8 | 0.1 | 55.95 | 0.14 | 31.3 | 0.2 |
| Feb. 10 | 45.12 | 0.14 | 19.6 | 0.3 | 3.28 | 0.24 | 56.9 | 0.4 | 55.81 | 0.15 | 31.1 | 0.3 |
| 20 | 44.98 | 0.14 | 19.3 | 0.2 | 3.04 | 0.24 | 56.5 | 0.7 | 55.66 | 0.17 | 30.8 | 0.3 |
| March 1 | 44.84 | 0.13 | 19.1 | 0.1 | 2.80 | 0.23 | 55.8 | 1.0 | 55.49 | 0.16 | 30.5 | 0.4 |
| 11 | 44.71 | 0.11 | 19.0 | 0.1 | 2.57 | 0.20 | 54.8 | 1.3 | 55.33 | 0.14 | 30.1 | 0.5 |
| 21 | 44.60 | 0.09 | 19.1 | 0.2 | 2.37 | 0.16 | 53.5 | 1.5 | 55.19 | 0.12 | 29.6 | 0.5 |
| 31 | 44.51 | 0.05 | 19.3 | 0.4 | 2.21 | 0.10 | 52.0 | 1.7 | 55.07 | 0.08 | 29.1 | 0.6 |
| April 10 | 44.46 | 0.01 | 19.7 | 0.6 | 2.11 | 0.05 | 50.3 | 1.7 | 54.99 | 0.04 | 28.5 | 0.5 |
| 20 | 44.47 | 0.05 | 20.3 | 0.9 | 2.06 | 0.04 | 48.6 | 1.7 | 54.95 | 0.00 | 28.0 | 0.3 |
| 30 | 44.52 | 0.08 | 21.2 | 1.1 | 2.10 | 0 09 | 46.9 | 1.6 | 54.95 | 0.05 | 27.7 | 0.2 |
| May 10 | 44.60 | 0.12 | 22.3 | 1.2 | 2.19 | 0.15 | 45.3 | 1.6 | 55.00 | 0.10 | 27.5 | 0.1 |
| 20 | 44.72 | 0.18 | 23.5 | 1.4 | 2.34 | 0.23 | 43.7 | 1.3 | 55.10 | 0.16 | 27.4 | 0.1 |
| 30 | 44.90 | 0.22 | 24.9 | 1.7 | 2.57 | 0.28 | 42.4 | 0.9 | 55.26 | 0.19 | 27.5 | 0.3 |
| June 9 | 45.12 | 0.24 | 26.6 | 1.8 | 2.85 | 0.33 | 41.5 | 0.6 | 55.45 | 0.24 | 27.8 | 0.5 |
| 19 | 45.36 | 0.27 | 28.4 | 1.8 | 3.18 | 0.37 | 40.9 | 0.4 | 55.69 | 0.27 | 28.3 | 0 8 |
| 29 | 45.63 | 0.29 | 30.2 | 1.9 | 3.55 | 0.42 | 40.5 | 0.1 | 55.96 | 0.29 | 29.1 | 0.9 |
| July 9 | 45.92 | 0.31 | 32.1 | 1.8 | 3.97 | 0.43 | 40.6 | 0.4 | 56.25 | 0.32 | 30.0 | 1.1 |
| 19 | 46.23 | 0.31 | 33.9 | 1.8 | 4.40 | 0.44 | 41.0 | 0.7 | 56.57 | 0.33 | 31.1 | 1.1 |
| 29 | 46.54 | 0.32 | 35.7 | 1.6 | 4.84 | 0.46 | 41.7 | 1.0 | 56.90 | 0.34 | 32.2 | 1.2 |
| Aug. 8 | 46.86 | 0.31 | 37.3 | 1.5 | 5.30 | 0.44 | 42.7 | 1.3 | 57.24 | 0.33 | 33.4 | 1.3 |
| 18 | 47.17 | 0.29 | 38.8 | 1.2 | 5.74 | 0.43 | 44.0 | 1.6 | 57.57 | 0.33 | 34.7 | 1.3 |
| 28 | 47.46 | 0.27 | 40.0 | 1.0 | 6.17 | 0.42 | 45.6 | 1.8 | 57.90 | 0.32 | 36.0 | 1.2 |
| Sept. 7 | 47.73 | 0.26 | 41.0 | 0.8 | 6.59 | 0.40 | 47.4 | 1.9 | 58.22 | 0.30 | 37.2 | 1.2 |
| 17 | 47.99 | 0.23 | 41.8 | 0.5 | 6.99 | 0.36 | 49.3 | 2.0 | 58.52 | 0.29 | 38.4 | 1.0 |
| 27 | 48.22 | 0.21 | 42.3 | 0.2 | 7.35 | 0.32 | 51.3 | 2.2 | 58.81 | 0.27 | 39.4 | 1.0 |
| Oct. 7 | 48.43 | 0.17 | 42.5 | 0.1 | 7.67 | 0.29 | 53.5 | 2.2 | 59.08 | 0.24 | 40.4 | 0.9 |
| 17 | 48.60 | 0.15 | 42.4 | 0.2 | 7.96 | 0.26 | 55.7 | 2.3 | 59.32 | 0.22 | 41.3 | 0.8 |
| 27 | 48.75 | 0.12 | 42.2 | 0.4 | 8.22 | 0.22 | 58.0 | 2.2 | 59.54 | 0.19 | 42.1 | 0.7 |
| Nov. 6 | 48.87 | 0.10 | 41.8 | 0.5 | 8.44 | 0.16 | 60.2 | 2.1 | 59.73 | 0.16 | 42.8 | 0.5 |
| 16 | 48.97 | 0.07 | 41.3 | 0.6 | 8.60 | 0.10 | 62.3 | 2.0 | 59.89 | 0.13 | 43.3 | 0.5 |
| 26 | 49.04 | 0.03 | 40.7 | 0.6 | 8.70 | 0.07 | 64.3 | 1.9 | 60.02 | 0.08 | 43.8 | 0.5 |
| Dec. 6 | 49.07 | 0.00 | 40.1 | 0.7 | 8.77 | 0.01 | 66.2 | 1.7 | 60.10 | 0.04 | 44.3 | 0.4 |
| 16 | 49.07 | 0.03 | 39.4 | 0.7 | 8.78 | 0.05 | 67.9 | 1.5 | 60.14 | 0.01 | 44.7 | 0.2 |
| 26 | 49.04 | 0.05 | 38.7 | 0.6 | 8.73 | 0.09 | 69.4 | 1.3 | 60.15 | 0.02 | 44.9 | 0.1 |
| 36 | 48.99 | | 38.1 | | 8.64 | | 70.7 | | 60.13 | | 45.0 | |

**Note.—Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;**

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | $\gamma^1$ Eridani. Right Ascension. | | $\gamma^1$ Eridani. Dec. *South*. | | α Tauri. (*Aldebaran.*) Right Ascension. | | α Tauri. (*Aldebaran.*) Dec. *North*. | | α Aurigæ. (*Capella.*) Right Ascension. | | α Aurigæ. (*Capella.*) Dec. *North*. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | h. 3 | m. 51 | 13° | 54′ | h. 4 | m. 27 | 16° | 13′ | h. 5 | m. 6 | 45° | 50′ |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 19.36 | 0.06 | 76.7 | 1.4 | 40.28 | 0.01 | 4.6 | 0.1 | 4.44 | 0.01 | 56.8 | 1.4 |
| 11 | 19.30 | 0.09 | 78.1 | 1.1 | 40.27 | 0.06 | 4.5 | 0.2 | 4.45 | 0.05 | 58.2 | 1.2 |
| 21 | 19.21 | 0.11 | 79.2 | 0.8 | 40.21 | 0.09 | 4.3 | 0.2 | 4.40 | 0.10 | 59.4 | 1.0 |
| 31 | 19.10 | 0.15 | 80.0 | 0.6 | 40.12 | 0.12 | 4.1 | 0.3 | 4.30 | 0.16 | 60.4 | 0.9 |
| Feb. 10 | 18.95 | 0.17 | 80.6 | 0.3 | 40.00 | 0.14 | 3.8 | 0.2 | 4.14 | 0.20 | 61.3 | 0.6 |
| 20 | 18.78 | 0.17 | 80.9 | 0.1 | 39.86 | 0.15 | 3.6 | 0.2 | 3.94 | 0.22 | 61.9 | 0.4 |
| March 1 | 18.61 | 0.16 | 81.0 | 0.2 | 39.71 | 0.17 | 3.4 | 0.2 | 3.72 | 0.23 | 62.3 | 0.0 |
| 11 | 18.45 | 0.15 | 80.8 | 0.6 | 39.54 | 0.16 | 3.2 | 0.1 | 3.49 | 0.24 | 62.3 | 0.3 |
| 21 | 18.30 | 0.13 | 80.2 | 0.8 | 39.38 | 0.14 | 3.1 | 0.2 | 3.25 | 0.23 | 62.0 | 0.6 |
| 31 | 18.17 | 0.10 | 79.4 | 1.1 | 39.24 | 0.11 | 2.9 | 0.1 | 3.02 | 0.20 | 61.4 | 0.8 |
| April 10 | 18.07 | 0.06 | 78.3 | 1.3 | 39.13 | 0.08 | 2.8 | 0.0 | 2.82 | 0.16 | 60.6 | 1.0 |
| 20 | 18.01 | 0.04 | 77.0 | 1.7 | 39.05 | 0.05 | 2.8 | 0.0 | 2.66 | 0.10 | 59.6 | 1.2 |
| 30 | 17.97 | 0.02 | 75.3 | 1.9 | 39.00 | 0.00 | 2.8 | 0.1 | 2.56 | 0.05 | 58.4 | 1.3 |
| May 10 | 17.99 | 0.06 | 73.4 | 2.0 | 39.00 | 0.06 | 2.9 | 0.3 | 2.51 | 0.02 | 57.1 | 1.4 |
| 20 | 18.05 | 0.11 | 71.4 | 2.2 | 39.06 | 0.09 | 3.2 | 0.5 | 2.53 | 0.07 | 55.7 | 1.4 |
| 30 | 18.16 | 0.15 | 69.2 | 2.4 | 39.15 | 0.13 | 3.7 | 0.6 | 2.60 | 0.13 | 54.3 | 1.3 |
| June 9 | 18.31 | 0.19 | 66.8 | 2.5 | 39.28 | 0.19 | 4.3 | 0.7 | 2.73 | 0.20 | 53.0 | 1.2 |
| 19 | 18.50 | 0.23 | 64.3 | 2.4 | 39.47 | 0.23 | 5.0 | 0.8 | 2.93 | 0.25 | 51.8 | 1.1 |
| 29 | 18.73 | 0.25 | 61.9 | 2.3 | 39.70 | 0.25 | 5.8 | 0.9 | 3.18 | 0.29 | 50.7 | 0.9 |
| July 9 | 18.98 | 0.28 | 59.6 | 2.3 | 39.95 | 0.28 | 6.7 | 1.1 | 3.47 | 0.34 | 49.8 | 0.5 |
| 19 | 19.26 | 0.29 | 57.3 | 2.0 | 40.23 | 0.29 | 7.8 | 1.1 | 3.81 | 0.36 | 49.3 | 0.4 |
| 29 | 19.55 | 0.30 | 55.3 | 1.7 | 40.52 | 0.31 | 8.9 | 1.1 | 4.17 | 0.39 | 48.9 | 0.3 |
| Aug. 8 | 19.85 | 0.30 | 53.6 | 1.4 | 40.83 | 0.32 | 10.0 | 1.0 | 4.56 | 0.41 | 48.6 | 0.0 |
| 18 | 20.15 | 0.31 | 52.2 | 1.0 | 41.15 | 0.32 | 11.0 | 1.0 | 4.97 | 0.42 | 48.6 | 0.1 |
| 28 | 20.46 | 0.30 | 51.2 | 0.6 | 41.47 | 0.31 | 12.0 | 0.8 | 5.39 | 0.43 | 48.7 | 0.3 |
| Sept. 7 | 20.76 | 0.28 | 50.6 | 0.2 | 41.78 | 0.31 | 12.8 | 0.7 | 5.82 | 0.42 | 49.0 | 0.6 |
| 17 | 21.04 | 0.27 | 50.4 | 0.2 | 42.09 | 0.30 | 13.5 | 0.6 | 6.24 | 0.43 | 49.6 | 0.7 |
| 27 | 21.31 | 0.25 | 50.6 | 0.6 | 42.39 | 0.29 | 14.1 | 0.4 | 6.67 | 0.42 | 50.3 | 0.9 |
| Oct. 7 | 21.56 | 0.22 | 51.2 | 0.9 | 42.68 | 0.27 | 14.5 | 0.2 | 7.09 | 0.40 | 51.2 | 1.0 |
| 17 | 21.78 | 0.20 | 52.1 | 1.3 | 42.95 | 0.25 | 14.7 | 0.2 | 7.49 | 0.37 | 52.2 | 1.1 |
| 27 | 21.98 | 0.17 | 53.4 | 1.5 | 43.20 | 0.22 | 14.9 | 0.1 | 7.86 | 0.34 | 53.3 | 1.2 |
| Nov. 6 | 22.15 | 0.14 | 54.9 | 1.6 | 43.42 | 0.20 | 15.0 | 0.1 | 8.20 | 0.32 | 54.5 | 1.3 |
| 16 | 22.29 | 0.10 | 56.5 | 1.7 | 43.62 | 0.17 | 14.9 | 0.1 | 8.52 | 0.28 | 55.8 | 1.4 |
| 26 | 22.39 | 0.07 | 58.2 | 1.7 | 43.79 | 0.13 | 14.8 | 0.2 | 8.80 | 0.22 | 57.2 | 1.5 |
| Dec. 6 | 22.46 | 0.03 | 59.9 | 1.7 | 43.92 | 0.10 | 14.6 | 0.1 | 9.02 | 0.16 | 58.7 | 1.5 |
| 16 | 22.49 | 0.00 | 61.6 | 1.6 | 44.02 | 0.05 | 14.5 | 0.2 | 9.18 | 0.10 | 60.2 | 1.4 |
| 26 | 22.49 | 0.04 | 63.2 | 1.4 | 44.07 | 0.02 | 14.3 | 0.2 | 9.28 | 0.06 | 61.6 | 1.5 |
| 36 | 22.45 | | 64.6 | | 44.09 | | 14.1 | | 9.34 | | 63.1 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Orionis. (*Rigel.*) | | | | β Tauri. | | | | δ Orionis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | |
| | h. 5 | m. 7 | ° 8 | ′ 21 | h. 5 | m. 17 | ° 28 | ′ 28 | h. 5 | m. 24 | ° 0 | ′ 24 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 37.93 | 0.00 | 73.7 | 1.6 | 12.33 | 0.03 | 60.6 | 0.5 | 39.90 | 0.02 | 29.2 | 1.2 |
| 11 | 37.93 | 0.03 | 75.3 | 1.2 | 12.36 | 0.01 | 61.1 | 0.4 | 39.92 | 0.01 | 30.4 | 1.0 |
| 21 | 37.90 | 0.08 | 76.5 | 1.0 | 12.35 | 0.07 | 61.5 | 0.4 | 39.91 | 0.07 | 31.4 | 0.8 |
| 31 | 37.82 | 0.12 | 77.5 | 0.8 | 12.28 | 0.11 | 61.9 | 0.3 | 39.84 | 0.09 | 32.2 | 0.7 |
| Feb. 10 | 37.70 | 0.14 | 78.3 | 0.6 | 12.17 | 0.14 | 62.2 | 0.2 | 39.75 | 0.13 | 32.9 | 0.5 |
| 20 | 37.56 | 0.16 | 78.9 | 0.5 | 12.03 | 0.16 | 62.4 | 0.2 | 39.62 | 0.15 | 33.4 | 0.4 |
| March 1 | 37.40 | 0.17 | 79.4 | 0.1 | 11.87 | 0.18 | 62.6 | 0.0 | 39.47 | 0.16 | 33.8 | 0.1 |
| 11 | 37.23 | 0.17 | 79.5 | 0.1 | 11.69 | 0.19 | 62.6 | 0.1 | 39.31 | 0.17 | 33.9 | 0.1 |
| 21 | 37.06 | 0.17 | 79.4 | 0.4 | 11.50 | 0.18 | 62.5 | 0.2 | 39.14 | 0.17 | 34.0 | 0.2 |
| 31 | 36.89 | 0.15 | 79.0 | 0.6 | 11.32 | 0.15 | 62.3 | 0.4 | 38.97 | 0.15 | 33.8 | 0.4 |
| April 10 | 36.74 | 0.11 | 78.4 | 0.8 | 11.17 | 0.12 | 61.9 | 0.4 | 38.82 | 0.11 | 33.4 | 0.5 |
| 20 | 36.63 | 0.08 | 77.6 | 0.9 | 11.05 | 0.08 | 61.5 | 0.5 | 38.71 | 0.08 | 32.9 | 0.7 |
| 30 | 36.55 | 0.04 | 76.7 | 1.3 | 10.97 | 0.04 | 61.0 | 0.5 | 38.63 | 0.04 | 32.2 | 0.9 |
| May 10 | 36.51 | 0.01 | 75.4 | 1.6 | 10.93 | 0.01 | 60.5 | 0.4 | 38.59 | 0.03 | 31.3 | 1.1 |
| 20 | 36.50 | 0.05 | 73.8 | 1.8 | 10.94 | 0.05 | 60.1 | 0.4 | 38.56 | 0.04 | 30.2 | 1.2 |
| 30 | 36.55 | 0.08 | 72.0 | 1.8 | 10.99 | 0.10 | 59.7 | 0.3 | 38.60 | 0.08 | 29.0 | 1.4 |
| June 9 | 36.63 | 0.12 | 70.2 | 2.0 | 11.09 | 0.15 | 59.4 | 0.2 | 38.68 | 0.11 | 27.6 | 1.5 |
| 19 | 36.75 | 0.17 | 68.2 | 2.0 | 11.24 | 0.20 | 59.2 | 0.1 | 38.79 | 0.15 | 26.1 | 1.6 |
| 29 | 36.92 | 0.19 | 66.2 | 2.0 | 11.44 | 0.23 | 59.1 | 0.1 | 38.94 | 0.19 | 24.5 | 1.6 |
| July 9 | 37.11 | 0.23 | 64.2 | 2.0 | 11.67 | 0.26 | 59.2 | 0.1 | 39.13 | 0.22 | 22.9 | 1.6 |
| 19 | 37.34 | 0.26 | 62.2 | 1.9 | 11.93 | 0.29 | 59.3 | 0.2 | 39.35 | 0.24 | 21.3 | 1.5 |
| 29 | 37.60 | 0.27 | 60.3 | 1.6 | 12.22 | 0.31 | 59.5 | 0.3 | 39.59 | 0.26 | 19.8 | 1.3 |
| Aug. 8 | 37.87 | 0.28 | 58.7 | 1.4 | 12.53 | 0.33 | 59.8 | 0.4 | 39.85 | 0.28 | 18.5 | 1.1 |
| 18 | 38.15 | 0.29 | 57.3 | 1.1 | 12.86 | 0.35 | 60.2 | 0.5 | 40.13 | 0.29 | 17.4 | 0.9 |
| 28 | 38.44 | 0.30 | 56.2 | 0.7 | 13.21 | 0.34 | 60.7 | 0.4 | 40.42 | 0.30 | 16.5 | 0.6 |
| Sept. 7 | 38.74 | 0.29 | 55.5 | 0.4 | 13.55 | 0.35 | 61.1 | 0.4 | 40.72 | 0.29 | 15.9 | 0.4 |
| 17 | 39.03 | 0.30 | 55.1 | 0.1 | 13.90 | 0.34 | 61.5 | 0.4 | 41.01 | 0.30 | 15.5 | 0.1 |
| 27 | 39.33 | 0.28 | 55.2 | 0.3 | 14.24 | 0.33 | 61.9 | 0.4 | 41.31 | 0.29 | 15.4 | 0.1 |
| Oct. 7 | 39.61 | 0.27 | 55.5 | 0.7 | 14.57 | 0.33 | 62.3 | 0.4 | 41.60 | 0.29 | 15.5 | 0.4 |
| 17 | 39.88 | 0.26 | 56.2 | 1.1 | 14.90 | 0.32 | 62.7 | 0.3 | 41.89 | 0.27 | 15.9 | 0.8 |
| 27 | 40.14 | 0.24 | 57.3 | 1.3 | 15.22 | 0.29 | 63.0 | 0.4 | 42.16 | 0.26 | 16.7 | 1.0 |
| Nov. 6 | 40.38 | 0.21 | 58.6 | 1.4 | 15.51 | 0.26 | 63.4 | 0.3 | 42.42 | 0.23 | 17.7 | 1.1 |
| 16 | 40.59 | 0.19 | 60.0 | 1.6 | 15.77 | 0.24 | 63.7 | 0.4 | 42.65 | 0.20 | 18.8 | 1.3 |
| 26 | 40.78 | 0.15 | 61.6 | 1.8 | 16.01 | 0.20 | 64.1 | 0.4 | 42.85 | 0.17 | 20.1 | 1.3 |
| Dec. 6 | 40.93 | 0.11 | 63.4 | 1.7 | 16.21 | 0.16 | 64.5 | 0.4 | 43.02 | 0.14 | 21.4 | 1.3 |
| 16 | 41.04 | 0.07 | 65.1 | 1.6 | 16.37 | 0.11 | 64.9 | 0.4 | 43.16 | 0.10 | 22.7 | 1.3 |
| 26 | 41.11 | 0.03 | 66.7 | 1.5 | 16.48 | 0.05 | 65.3 | 0.3 | 43.26 | 0.05 | 24.0 | 1.2 |
| 36 | 41.14 | | 68.2 | | 16.53 | | 65.6 | | 43.31 | | 25.2 | |

**Note.** — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | *α* Leporis. | | | | ε Orionis. | | | | *α* Columbæ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 5 | m. 26 | 17° | 55′ | h. 5 | m. 28 | 1° | 17′ | h. 5 | m. 34 | 34° | 8′ |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 23.78 | 0.02 | 39.4 | 2.0 | 55.27 | 0.02 | 46.9 | 1.1 | 27.48 | 0.01 | 68.9 | 2.6 |
| 11 | 23.80 | 0.05 | 41.4 | 1.7 | 55.29 | 0.01 | 48.0 | 1.0 | 27.47 | 0.07 | 71.5 | 2.3 |
| 21 | 23.75 | 0.08 | 43.1 | 1.5 | 55.28 | 0.06 | 49.0 | 0.8 | 27.40 | 0.11 | 73.8 | 2.0 |
| 31 | 23.67 | 0.12 | 44.6 | 1.2 | 55.22 | 0.09 | 49.8 | 0.7 | 27.29 | 0.16 | 75.8 | 1.7 |
| Feb. 10 | 23.55 | 0.15 | 45.8 | 0.9 | 55.13 | 0.13 | 50.5 | 0.5 | 27.13 | 0.20 | 77.5 | 1.3 |
| 20 | 23.40 | 0.17 | 46.7 | 0.6 | 55.00 | 0.15 | 51.0 | 0.2 | 26.93 | 0.22 | 78.8 | 0.8 |
| March 1 | 23.23 | 0.18 | 47.3 | 0.3 | 54.85 | 0.16 | 51.2 | 0.1 | 26.71 | 0.23 | 79.6 | 0.4 |
| 11 | 23.05 | 0.19 | 47.6 | 0.0 | 54.69 | 0.17 | 51.3 | 0.0 | 26.48 | 0.23 | 80.0 | 0.0 |
| 21 | 22.86 | 0.18 | 47.6 | 0.4 | 54.52 | 0.16 | 51.3 | 0.3 | 26.25 | 0.23 | 80.0 | 0.4 |
| 31 | 22.68 | 0.17 | 47.2 | 0.7 | 54.36 | 0.15 | 51.0 | 0.6 | 26.02 | 0.21 | 79.6 | 0.9 |
| April 10 | 22.51 | 0.14 | 46.5 | 1.0 | 54.21 | 0.12 | 50.4 | 0.7 | 25.81 | 0.19 | 78.7 | 1.4 |
| 20 | 22.37 | 0.10 | 45.5 | 1.4 | 54.09 | 0.09 | 49.7 | 0.8 | 25.62 | 0.15 | 77.3 | 1.7 |
| 30 | 22.27 | 0.07 | 44.1 | 1.6 | 54.00 | 0.05 | 48.9 | 1.0 | 25.47 | 0.12 | 75.6 | 2.0 |
| May 10 | 22.20 | 0.04 | 42.5 | 1.9 | 53.95 | 0.02 | 47.9 | 1.2 | 25.35 | 0.06 | 73.6 | 2.4 |
| 20 | 22.16 | 0.01 | 40.6 | 2.1 | 53.93 | 0.03 | 46.7 | 1.3 | 25.29 | 0.03 | 71.2 | 2.7 |
| 30 | 22.17 | 0.05 | 38.5 | 2.2 | 53.96 | 0.07 | 45.4 | 1.5 | 25.26 | 0.02 | 68.5 | 2.9 |
| June 9 | 22.22 | 0.10 | 36.3 | 2.4 | 54.03 | 0.11 | 43.9 | 1.5 | 25.28 | 0.07 | 65.6 | 3.0 |
| 19 | 22.32 | 0.15 | 33.9 | 2.5 | 54.14 | 0.15 | 42.4 | 1.6 | 25.35 | 0.12 | 62.6 | 3.1 |
| 29 | 22.47 | 0.18 | 31.4 | 2.5 | 54.29 | 0.18 | 40.8 | 1.6 | 25.47 | 0.16 | 59.5 | 3.0 |
| July 9 | 22.65 | 0.20 | 28.9 | 2.3 | 54.47 | 0.21 | 39.2 | 1.5 | 25.63 | 0.20 | 56.5 | 2.9 |
| 19 | 22.85 | 0.24 | 26.6 | 2.1 | 54.68 | 0.25 | 37.7 | 1.5 | 25.83 | 0.24 | 53.6 | 2.7 |
| 29 | 23.09 | 0.26 | 24.5 | 1.9 | 54.93 | 0.26 | 36.2 | 1.3 | 26.07 | 0.27 | 50.9 | 2.3 |
| Aug. 8 | 23.35 | 0.28 | 22.6 | 1.6 | 55.19 | 0.28 | 34.9 | 1.1 | 26.34 | 0.29 | 48.6 | 1.9 |
| 18 | 23.63 | 0.29 | 21.0 | 1.3 | 55.47 | 0.29 | 33.8 | 0.8 | 26.63 | 0.31 | 46.7 | 1.5 |
| 28 | 23.92 | 0.29 | 19.7 | 0.8 | 55.76 | 0.29 | 33.0 | 0.5 | 26.94 | 0.32 | 45.2 | 1.0 |
| Sept. 7 | 24.21 | 0.30 | 18.9 | 0.4 | 56.05 | 0.29 | 32.5 | 0.3 | 27.26 | 0.32 | 44.2 | 0.4 |
| 17 | 24.51 | 0.30 | 18.5 | 0.1 | 56.34 | 0.29 | 32.2 | 0.1 | 27.58 | 0.33 | 43.8 | 0.1 |
| 27 | 24.81 | 0.29 | 18.6 | 0.6 | 56.63 | 0.29 | 32.3 | 0.3 | 27.91 | 0.32 | 43.9 | 0.8 |
| Oct. 7 | 25.10 | 0.29 | 19.2 | 1.0 | 56.92 | 0.29 | 32.6 | 0.6 | 28.23 | 0.32 | 44.7 | 1.3 |
| 17 | 25.39 | 0.27 | 20.2 | 1.3 | 57.21 | 0.28 | 33.2 | 1.0 | 28.55 | 0.29 | 46.0 | 1.7 |
| 27 | 25.66 | 0.25 | 21.5 | 1.6 | 57.49 | 0.26 | 34.2 | 1.1 | 28.84 | 0.27 | 47.7 | 2.1 |
| Nov. 6 | 25.91 | 0.22 | 23.1 | 2.0 | 57.75 | 0.23 | 35.3 | 1.3 | 29.11 | 0.24 | 49.8 | 2.6 |
| 16 | 26.13 | 0.19 | 25.1 | 2.1 | 57.98 | 0.20 | 36.6 | 1.4 | 29.35 | 0.20 | 52.4 | 2.7 |
| 26 | 26.32 | 0.17 | 27.2 | 2.2 | 58.18 | 0.18 | 38.0 | 1.4 | 29.55 | 0.17 | 55.1 | 2.9 |
| Dec. 6 | 26.49 | 0.12 | 29.4 | 2.2 | 58.36 | 0.15 | 39.4 | 1.4 | 29.72 | 0.11 | 58.0 | 2.9 |
| 16 | 26.61 | 0.08 | 31.6 | 2.2 | 58.51 | 0.10 | 40.8 | 1.3 | 29.83 | 0.06 | 60.9 | 2.8 |
| 26 | 26.69 | 0.03 | 33.8 | 2.1 | 58.61 | 0.05 | 42.1 | 1.2 | 29.89 | 0.01 | 63.7 | 2.7 |
| 36 | 26.72 | | 35.9 | | 58.66 | | 43.3 | | 29.90 | | 66.4 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Orionis. | | | | μ Geminorum. | | | | α Argus. (*Canopus.*) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | |
| | h. m. 5 47 | | ° ′ 7 22 | | h. m. 6 14 | | ° ′ 22 35 | | h. m. 6 20 | | ° ′ 52 36 | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 23.42 | 0.05 | 40.4 | 0.8 | 15.81 | 0.09 | 5.6 | 0.1 | 47.43 | 0.02 | 60.8 | 3.3 |
| 11 | 23.47 | 0.01 | 39.6 | 0.7 | 15.90 | 0.04 | 5.7 | 0.1 | 47.41 | 0.10 | 64.1 | 3.1 |
| 21 | 23.48 | 0.05 | 38.9 | 0.6 | 15.94 | 0.02 | 5.8 | 0.2 | 47.31 | 0.17 | 67.2 | 2.8 |
| 31 | 23.43 | 0.08 | 38.3 | 0.4 | 15.92 | 0.06 | 6.0 | 0.1 | 47.14 | 0.21 | 70.0 | 2.4 |
| Feb. 10 | 23.35 | 0.11 | 37.9 | 0.3 | 15.86 | 0.09 | 6.1 | 0.2 | 46.93 | 0.26 | 72.4 | 2.0 |
| 20 | 23.24 | 0.14 | 37.6 | 0.2 | 15.77 | 0.14 | 6.3 | 0.2 | 46.67 | 0.32 | 74.4 | 1.6 |
| March 1 | 23.10 | 0.16 | 37.4 | 0.1 | 15.63 | 0.17 | 6.5 | 0.2 | 46.35 | 0.33 | 76.0 | 1.1 |
| 11 | 22.94 | 0.16 | 37.3 | 0.1 | 15.46 | 0.17 | 6.7 | 0.2 | 46.02 | 0.35 | 77.1 | 0.5 |
| 21 | 22.78 | 0.16 | 37.2 | 0.1 | 15.29 | 0.17 | 6.9 | 0.1 | 45.67 | 0.36 | 77.6 | 0.1 |
| 31 | 22.62 | 0.16 | 37.3 | 0.1 | 15.12 | 0.17 | 7.0 | 0.0 | 45.31 | 0.35 | 77.7 | 0.4 |
| April 10 | 22.46 | 0.13 | 37.4 | 0.3 | 14.95 | 0.15 | 7.0 | 0.0 | 44.96 | 0.32 | 77.3 | 1.0 |
| 20 | 22.33 | 0.09 | 37.7 | 0.4 | 14.80 | 0.12 | 7.0 | 0.1 | 44.64 | 0.29 | 76.3 | 1.5 |
| 30 | 22.24 | 0.05 | 38.1 | 0.6 | 14.68 | 0.07 | 6.9 | 0.1 | 44.35 | 0.25 | 74.8 | 1.9 |
| May 10 | 22.19 | 0.03 | 38.7 | 0.7 | 14.61 | 0.04 | 6.8 | 0.1 | 44.10 | 0.20 | 72.9 | 2.3 |
| 20 | 22.16 | 0.01 | 39.4 | 0.7 | 14.57 | 0.00 | 6.7 | 0.1 | 43.90 | 0.15 | 70.6 | 2.7 |
| 30 | 22.17 | 0.07 | 40.1 | 0.7 | 14.57 | 0.04 | 6.6 | 0.1 | 43.75 | 0.09 | 67.9 | 3.0 |
| June 9 | 22.24 | 0.10 | 40.8 | 1.0 | 14.61 | 0.09 | 6.5 | 0.0 | 43.66 | 0.03 | 64.9 | 3.3 |
| 19 | 22.34 | 0.14 | 41.8 | 1.2 | 14.70 | 0.13 | 6.5 | 0.1 | 43.63 | 0.03 | 61.6 | 3.3 |
| 29 | 22.48 | 0.18 | 43.0 | 1.2 | 14.83 | 0.17 | 6.6 | 0.1 | 43.66 | 0.10 | 58.3 | 3.4 |
| July 9 | 22.66 | 0.21 | 44.2 | 1.0 | 15.00 | 0.21 | 6.7 | 0.1 | 43.76 | 0.15 | 54.9 | 3.3 |
| 19 | 22.87 | 0.23 | 45.2 | 1.0 | 15.21 | 0.23 | 6.8 | 0.2 | 43.91 | 0.20 | 51.6 | 3.2 |
| 29 | 23.10 | 0.25 | 46.2 | 1.0 | 15.44 | 0.26 | 7.0 | 0.1 | 44.11 | 0.26 | 48.4 | 2.9 |
| Aug. 8 | 23.35 | 0.27 | 47.2 | 0.9 | 15.70 | 0.28 | 7.1 | 0.1 | 44.37 | 0.30 | 45.5 | 2.5 |
| 18 | 23.62 | 0.29 | 48.1 | 0.7 | 15.98 | 0.31 | 7.2 | 0.2 | 44.67 | 0.34 | 43.0 | 2.0 |
| 28 | 23.91 | 0.30 | 48.8 | 0.5 | 16.29 | 0.31 | 7.4 | 0.1 | 45.01 | 0.37 | 41.0 | 1.4 |
| Sept. 7 | 24.21 | 0.31 | 49.3 | 0.3 | 16.60 | 0.32 | 7.5 | 0.1 | 45.38 | 0.39 | 39.6 | 0.9 |
| 17 | 24.52 | 0.30 | 49.6 | 0.0 | 16.92 | 0.33 | 7.4 | 0.1 | 45.77 | 0.41 | 38.7 | 0.2 |
| 27 | 24.82 | 0.30 | 49.6 | 0.1 | 17.25 | 0.33 | 7.3 | 0.2 | 46.18 | 0.42 | 38.5 | 0.5 |
| Oct. 7 | 25.12 | 0.30 | 49.5 | 0.4 | 17.58 | 0.33 | 7.1 | 0.2 | 46.60 | 0.41 | 39.0 | 1.1 |
| 17 | 25.42 | 0.29 | 49.1 | 0.6 | 17.91 | 0.33 | 6.9 | 0.3 | 47.01 | 0.39 | 40.1 | 1.6 |
| 27 | 25.71 | 0.28 | 48.5 | 0.7 | 18.24 | 0.31 | 6.6 | 0.3 | 47.40 | 0.37 | 41.7 | 2.2 |
| Nov. 6 | 25.99 | 0.26 | 47.8 | 0.9 | 18.55 | 0.31 | 6.3 | 0.3 | 47.77 | 0.34 | 43.9 | 2.7 |
| 16 | 26.25 | 0.23 | 46.9 | 0.9 | 18.86 | 0.28 | 6.0 | 0.3 | 48.11 | 0.27 | 46.6 | 3.0 |
| 26 | 26.48 | 0.20 | 46.0 | 0.9 | 19.14 | 0.25 | 5.7 | 0.2 | 48.38 | 0.23 | 49.6 | 3.2 |
| Dec. 6 | 26.68 | 0.16 | 45.1 | 1.0 | 19.39 | 0.20 | 5.5 | 0.2 | 48.61 | 0.16 | 52.8 | 3.4 |
| 16 | 26.84 | 0.12 | 44.1 | 0.9 | 19.59 | 0.17 | 5.3 | 0.1 | 48.77 | 0.10 | 56.2 | 3.5 |
| 26 | 26.96 | 0.09 | 43.2 | 0.8 | 19.76 | 0.12 | 5.2 | 0.0 | 48.87 | 0.02 | 59.7 | 3.4 |
| 36 | 27.05 | | 42.4 | | 19.88 | | 5.2 | | 48.89 | | 63.1 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | 51 (Hev.) Cephei. | | | | α Canis Majoris. (*Sirius.*) | | | | ε Canis Majoris. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 6 m. 31 | | 87° 14′ | | h. 6 m. 38 | | 16° 30′ | | h. 6 m. 52 | | 28° 46′ | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 60.99 | 0.35 | 73.3 | 3.3 | 49.01 | 0.07 | 72.5 | 2.2 | 59.13 | 0.08 | 37.9 | 2.8 |
| 11 | 61.34 | 0.48 | 76.6 | 3.2 | 49.08 | 0.02 | 74.7 | 2.1 | 59.21 | 0.02 | 40.7 | 2.6 |
| 21 | 60.86 | 1.34 | 79.8 | 3.0 | 49.10 | 0.03 | 76.8 | 1.9 | 59.23 | 0.03 | 43.3 | 2.4 |
| 31 | 59.52 | 2.15 | 82.8 | 2.7 | 49.07 | 0.08 | 78.7 | 1.6 | 59.20 | 0.07 | 45.7 | 2.2 |
| Feb. 10 | 57.37 | 2.89 | 85.5 | 2.3 | 48.99 | 0.11 | 80.3 | 1.3 | 59.13 | 0.12 | 47.9 | 1.9 |
| 20 | 54.48 | 3.51 | 87.8 | 1.8 | 48.88 | 0.14 | 81.6 | 1.1 | 59.01 | 0.17 | 49.8 | 1.4 |
| March 1 | 50.97 | 3.95 | 89.6 | 1.3 | 48.74 | 0.17 | 82.7 | 0.7 | 58.84 | 0.19 | 51.2 | 1.1 |
| 11 | 47.02 | 4.19 | 90.9 | 0.6 | 48.57 | 0.18 | 83.4 | 0.5 | 58.65 | 0.20 | 52.3 | 0.7 |
| 21 | 42.83 | 4.26 | 91.5 | 0.1 | 48.39 | 0.19 | 83.9 | 0.1 | 58.45 | 0.21 | 53.0 | 0.3 |
| 31 | 38.57 | 4.09 | 91.6 | 0.6 | 48.20 | 0.18 | 84.0 | 0.2 | 58.24 | 0.21 | 53.3 | 0.1 |
| April 10 | 34.48 | 3.80 | 91.0 | 1.1 | 48.02 | 0.16 | 83.8 | 0.5 | 58.03 | 0.20 | 53.2 | 0.6 |
| 20 | 30.68 | 3.39 | 89.9 | 1.7 | 47.86 | 0.14 | 83.3 | 0.8 | 57.83 | 0.18 | 52.6 | 0.9 |
| 30 | 27.29 | 2.84 | 88.2 | 2.1 | 47.72 | 0.12 | 82.5 | 1.2 | 57.65 | 0.15 | 51.7 | 1.3 |
| May 10 | 24.45 | 2.18 | 86.1 | 2.5 | 47.60 | 0.07 | 81.3 | 1.4 | 57.50 | 0.11 | 50.4 | 1.6 |
| 20 | 22.27 | 1.48 | 83.6 | 2.7 | 47.53 | 0.04 | 79.9 | 1.6 | 57.39 | 0.09 | 48.8 | 2.0 |
| 30 | 20.79 | 0.77 | 80.9 | 3.0 | 47.49 | 0.01 | 78.3 | 1.9 | 57.30 | 0.04 | 46.8 | 2.2 |
| June 9 | 20.02 | 0.04 | 77.9 | 3.2 | 47.50 | 0.04 | 76.4 | 2.0 | 57.26 | 0.01 | 44.6 | 2.5 |
| 19 | 19.98 | 0.72 | 74.7 | 3.1 | 47.54 | 0.08 | 74.4 | 2.1 | 57.27 | 0.04 | 42.1 | 2.7 |
| 29 | 20.70 | 1.59 | 71.6 | 3.0 | 47.62 | 0.12 | 72.3 | 2.2 | 57.31 | 0.08 | 39.4 | 2.7 |
| July 9 | 22.29 | 2.34 | 68.6 | 2.8 | 47.74 | 0.16 | 70.1 | 2.1 | 57.39 | 0.12 | 36.7 | 2.6 |
| 19 | 24.63 | 3.03 | 65.8 | 2.6 | 47.90 | 0.18 | 68.0 | 2.0 | 57.51 | 0.16 | 34.1 | 2.5 |
| 29 | 27.66 | 3.66 | 63.2 | 2.4 | 48.08 | 0.21 | 66.0 | 1.9 | 57.67 | 0.19 | 31.6 | 2.4 |
| Aug. 8 | 31.32 | 4.18 | 60.8 | 2.2 | 48.29 | 0.23 | 64.1 | 1.6 | 57.86 | 0.23 | 29.2 | 2.1 |
| 18 | 35.50 | 4.64 | 58.6 | 1.8 | 48.52 | 0.25 | 62.5 | 1.3 | 58.09 | 0.25 | 27.1 | 1.7 |
| 28 | 40.14 | 5.02 | 56.8 | 1.4 | 48.77 | 0.28 | 61.2 | 0.9 | 58.34 | 0.27 | 25.4 | 1.3 |
| Sept. 7 | 45.16 | 5.28 | 55.4 | 1.0 | 49.05 | 0.29 | 60.3 | 0.6 | 58.61 | 0.29 | 24.1 | 0.8 |
| 17 | 50.44 | 5.50 | 54.4 | 0.4 | 49.34 | 0.29 | 59.7 | 0.0 | 58.90 | 0.31 | 23.3 | 0.2 |
| 27 | 55.94 | 5.58 | 54.0 | 0.1 | 49.63 | 0.30 | 59.7 | 0.4 | 59.21 | 0.32 | 23.1 | 0.2 |
| Oct. 7 | 61.52 | 5.47 | 53.9 | 0.5 | 49.93 | 0.31 | 60.1 | 0.8 | 59.53 | 0.32 | 23.3 | 0.8 |
| 17 | 66.99 | 5.29 | 54.4 | 1.0 | 50.24 | 0.30 | 60.9 | 1.3 | 59.85 | 0.32 | 24.1 | 1.3 |
| 27 | 72.28 | 5.05 | 55.4 | 1.5 | 50.54 | 0.29 | 62.2 | 1.6 | 60.17 | 0.31 | 25.4 | 1.7 |
| Nov. 6 | 77.33 | 4.71 | 56.9 | 1.9 | 50.83 | 0.26 | 63.8 | 1.9 | 60.48 | 0.30 | 27.1 | 2.2 |
| 16 | 82.04 | 4.16 | 58.8 | 2.2 | 51.09 | 0.24 | 65.7 | 2.1 | 60.78 | 0.27 | 29.3 | 2.4 |
| 26 | 86.20 | 3.45 | 61.0 | 2.6 | 51.33 | 0.22 | 67.8 | 2.3 | 61.05 | 0.25 | 31.7 | 2.7 |
| Dec. 6 | 89.65 | 2.62 | 63.6 | 3.0 | 51.55 | 0.19 | 70.1 | 2.4 | 61.30 | 0.20 | 34.4 | 2.9 |
| 16 | 92.27 | 1.86 | 66.6 | 3.1 | 51.74 | 0.14 | 72.5 | 2.3 | 61.50 | 0.16 | 37.3 | 2.9 |
| 26 | 94.13 | 0.99 | 69.7 | 3.2 | 51.88 | 0.09 | 74.8 | 2.4 | 61.66 | 0.11 | 40.2 | 2.8 |
| 36 | 95.12 | | 72.9 | | 51.97 | | 77.2 | | 61.77 | | 43.0 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | δ Geminorum. | | | | α² Geminorum. (*Castor.*) | | | | α Canis Minoris. (*Procyon.*) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. m.<br>7 11 | | ° ′<br>22 14 | | h. m.<br>7 25 | | ° ′<br>32 11 | | h. m.<br>7 31 | | ° ′<br>5 35 | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 32.16 | 0.15 | 41.3 | 0.2 | 25.45 | 0.17 | 63.5 | 0.4 | 46.51 | 0.14 | 33.3 | 1.2 |
| 11 | 32.31 | 0.09 | 41.1 | 0.0 | 25.62 | 0.12 | 63.9 | 0.6 | 46.65 | 0.10 | 32.1 | 1.1 |
| 21 | 32.40 | 0.05 | 41.1 | 0.2 | 25.74 | 0.06 | 64.5 | 0.7 | 46.75 | 0.06 | 31.0 | 0.9 |
| 31 | 32.45 | 0.00 | 41.3 | 0.2 | 25.80 | 0.00 | 65.2 | 0.7 | 46.81 | 0.00 | 30.1 | 0.6 |
| Feb. 10 | 32.45 | 0.07 | 41.5 | 0.3 | 25.80 | 0.05 | 65.9 | 0.8 | 46.81 | 0.05 | 29.5 | 0.6 |
| 20 | 32.38 | 0.10 | 41.8 | 0.3 | 25.75 | 0.10 | 66.7 | 0.8 | 46.76 | 0.09 | 28.9 | 0.5 |
| March 1 | 32.28 | 0.14 | 42.1 | 0.4 | 25.65 | 0.14 | 67.5 | 0.7 | 46.67 | 0.12 | 28.4 | 0.3 |
| 11 | 32.14 | 0.16 | 42.5 | 0.3 | 25.51 | 0.16 | 68.2 | 0.6 | 46.55 | 0.14 | 28.1 | 0.1 |
| 21 | 31.98 | 0.16 | 42.8 | 0.3 | 25.35 | 0.18 | 68.8 | 0.5 | 46.41 | 0.15 | 28.0 | 0.0 |
| 31 | 31.82 | 0.17 | 43.1 | 0.2 | 25.17 | 0.19 | 69.3 | 0.4 | 46.26 | 0.16 | 28.0 | 0.1 |
| April 10 | 31.65 | 0.16 | 43.3 | 0.2 | 24.98 | 0.18 | 69.7 | 0.2 | 46.10 | 0.15 | 28.1 | 0.2 |
| 20 | 31.49 | 0.14 | 43.5 | 0.1 | 24.80 | 0.15 | 69.9 | 0.0 | 45.95 | 0.13 | 28.3 | 0.4 |
| 30 | 31.35 | 0.11 | 43.6 | 0.1 | 24.65 | 0.13 | 69.9 | 0.2 | 45.82 | 0.12 | 28.7 | 0.5 |
| May 10 | 31.24 | 0.08 | 43.7 | 0.0 | 24.52 | 0.10 | 69.7 | 0.3 | 45.70 | 0.09 | 29.2 | 0.5 |
| 20 | 31.16 | 0.05 | 43.7 | 0.0 | 24.42 | 0.07 | 69.4 | 0.4 | 45.61 | 0.06 | 29.7 | 0.6 |
| 30 | 31.11 | 0.00 | 43.7 | 0.1 | 24.35 | 0.03 | 69.0 | 0.5 | 45.55 | 0.03 | 30.3 | 0.7 |
| June 9 | 31.11 | 0.03 | 43.6 | 0.1 | 24.32 | 0.02 | 68.5 | 0.6 | 45.52 | 0.01 | 31.0 | 0.8 |
| 19 | 31.14 | 0.08 | 43.5 | 0.1 | 24.34 | 0.07 | 67.9 | 0.7 | 45.51 | 0.05 | 31.8 | 0.8 |
| 29 | 31.22 | 0.11 | 43.4 | 0.0 | 24.41 | 0.11 | 67.2 | 0.7 | 45.56 | 0.09 | 32.6 | 0.8 |
| July 9 | 31.33 | 0.14 | 43.4 | 0.1 | 24.52 | 0.14 | 66.5 | 0.8 | 45.65 | 0.11 | 33.4 | 0.8 |
| 19 | 31.47 | 0.18 | 43.3 | 0.2 | 24.66 | 0 18 | 65.7 | 0.8 | 45.76 | 0.14 | 34.2 | 0.8 |
| 29 | 31.65 | 0.21 | 43.1 | 0.1 | 24.84 | 0 21 | 64.9 | 0.8 | 45.90 | 0.17 | 35.0 | 0.7 |
| Aug. 8 | 31.86 | 0.24 | 43.0 | 0.2 | 25.05 | 0.25 | 64.1 | 0.8 | 46.07 | 0.20 | 35.7 | 0.6 |
| 18 | 32.10 | 0.27 | 42.8 | 0.3 | 25.30 | 0.27 | 63.3 | 0.8 | 46.27 | 0.22 | 36.3 | 0.3 |
| 28 | 32.37 | 0.28 | 42.5 | 0.4 | 25.57 | 0.29 | 62.5 | 0.8 | 46.49 | 0.25 | 36.6 | 0.0 |
| Sept. 7 | 32.65 | 0.30 | 42.1 | 0.4 | 25.86 | 0.33 | 61.7 | 0.8 | 46.74 | 0.26 | 36.6 | 0.0 |
| 17 | 32.95 | 0.31 | 41.7 | 0.5 | 26.19 | 0.34 | 60.9 | 0.8 | 47.00 | 0.28 | 36.6 | 0.3 |
| 27 | 33.26 | 0.33 | 41.2 | 0.6 | 26.53 | 0.35 | 60.1 | 0.8 | 47.28 | 0.30 | 36.3 | 0.6 |
| Oct. 7 | 33.59 | 0.33 | 40.6 | 0.7 | 26.88 | 0.35 | 59.3 | 0.8 | 47.58 | 0.31 | 35.7 | 0.8 |
| 17 | 33.92 | 0.34 | 39.9 | 0.7 | 27.23 | 0.37 | 58.5 | 0.7 | 47.89 | 0.31 | 34.9 | 1.0 |
| 27 | 34.26 | 0.34 | 39.2 | 0.7 | 27.60 | 0.38 | 57.8 | 0.6 | 48.20 | 0.32 | 33.9 | 1.2 |
| Nov. 6 | 34.60 | 0.34 | 38.5 | 0.8 | 27.98 | 0.38 | 57.2 | 0.5 | 48.52 | 0.31 | 32.7 | 1.3 |
| 16 | 34.94 | 0.32 | 37.7 | 0.7 | 28.36 | 0.35 | 56.7 | 0.4 | 48.83 | 0.30 | 31.4 | 1.5 |
| 26 | 35.26 | 0.30 | 37.0 | 0.6 | 28.71 | 0.33 | 56.3 | 0.2 | 49.13 | 0.28 | 29.9 | 1.5 |
| Dec. 6 | 35.56 | 0.26 | 36.4 | 0.5 | 29.04 | 0.30 | 56.1 | 0.1 | 49.41 | 0.26 | 28.4 | 1.5 |
| 16 | 35.82 | 0.23 | 35.9 | 0.3 | 29.34 | 0.26 | 56.0 | 0.2 | 49.67 | 0.22 | 26.9 | 1.4 |
| 26 | 36.05 | 0.17 | 35.6 | 0.3 | 29.60 | 0.20 | 56.2 | 0.2 | 49.89 | 0.17 | 25.5 | 1.3 |
| 36 | 36.22 | | 35.3 | | 29.80 | | 56.4 | | 50.06 | | 24.2 | |

**Note.** — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Geminorum. (*Pollux.*) | | | | 15 Argus. | | | | ε Hydræ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | |
| | h. 7 | m. 36 | ° 28 | ′ 22 | h. 8 | m. 1 | ° 23 | ′ 53 | h. 8 | m. 39 | ° 6 | 56 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 30.90 | 0.17 | 15.9 | 0.2 | 25.59 | 0.16 | 21.0 | 2.8 | 9.58 | 0.21 | 44.6 | 1.4 |
| 11 | 31.07 | 0.14 | 16.1 | 0.3 | 25.75 | 0.10 | 23.8 | 2.7 | 9.79 | 0.16 | 43.2 | 1.2 |
| 21 | 31.21 | 0.09 | 16.4 | 0.3 | 25.85 | 0.05 | 26.5 | 2.5 | 9.95 | 0.12 | 42.0 | 1.0 |
| 31 | 31.30 | 0.03 | 16.7 | 0.7 | 25.90 | 0.01 | 29.0 | 2.3 | 10.07 | 0.07 | 41.0 | 0.8 |
| Feb. 10 | 31.33 | 0.05 | 17.4 | 0.6 | 25.91 | 0.06 | 31.3 | 2.1 | 10.14 | 0.03 | 40.2 | 0.6 |
| 20 | 31.28 | 0.10 | 18.0 | 0.7 | 25.85 | 0.09 | 33.4 | 1.8 | 10.17 | 0.04 | 39.6 | 0.4 |
| March 1 | 31.18 | 0.13 | 18.7 | 0.6 | 25.76 | 0.13 | 35.2 | 1.4 | 10.13 | 0.07 | 39.2 | 0.2 |
| 11 | 31.05 | 0.15 | 19.3 | 0.6 | 25.63 | 0.16 | 36.6 | 1.2 | 10.06 | 0.09 | 39.0 | 0.1 |
| 21 | 30.90 | 0.17 | 19.9 | 0.5 | 25.47 | 0.17 | 37.8 | 0.7 | 9.97 | 0.13 | 38.9 | 0.1 |
| 31 | 30.73 | 0.18 | 20.4 | 0.4 | 25.30 | 0.18 | 38.5 | 0.4 | 9.84 | 0.14 | 39.0 | 0.2 |
| April 10 | 30.55 | 0.17 | 20.8 | 0.3 | 25.12 | 0.19 | 38.9 | 0.1 | 9.70 | 0.15 | 39.2 | 0.3 |
| 20 | 30.38 | 0.15 | 21.1 | 0.1 | 24.93 | 0.18 | 39.0 | 0.4 | 9.55 | 0.13 | 39.5 | 0.3 |
| 30 | 30.23 | 0.14 | 21.2 | 0.1 | 24.75 | 0.16 | 38.6 | 0.6 | 9.42 | 0.13 | 39.8 | 0.5 |
| May 10 | 30.09 | 0.11 | 21.1 | 0.1 | 24.59 | 0.13 | 38.0 | 1.1 | 9.29 | 0.11 | 40.3 | 0.5 |
| 20 | 29.98 | 0.07 | 21.0 | 0.2 | 24.46 | 0.11 | 36.9 | 1.3 | 9.18 | 0.09 | 40.8 | 0.5 |
| 30 | 29.91 | 0.03 | 20.8 | 0.3 | 24.35 | 0.08 | 35.6 | 1.6 | 9.09 | 0.06 | 41.3 | 0.6 |
| June 9 | 29.88 | 0.01 | 20.5 | 0.4 | 24.27 | 0.05 | 34.0 | 1.9 | 9.03 | 0.04 | 41.9 | 0.6 |
| 19 | 29.89 | 0.06 | 20.1 | 0.5 | 24.22 | 0.01 | 32.1 | 2.1 | 8.99 | 0.01 | 42.5 | 0.6 |
| 29 | 29.95 | 0.09 | 19.6 | 0.5 | 24.21 | 0.03 | 30.0 | 2.2 | 8.98 | 0.02 | 43.1 | 0.6 |
| July 9 | 30.04 | 0.13 | 19.1 | 0.6 | 24.24 | 0.06 | 27.8 | 2.2 | 9.00 | 0.04 | 43.7 | 0.6 |
| 19 | 30.17 | 0.16 | 18.5 | 0.4 | 24.30 | 0.09 | 25.6 | 2.3 | 9.04 | 0.08 | 44.3 | 0.5 |
| 29 | 30.33 | 0.19 | 18.1 | 0.8 | 24.39 | 0.12 | 23.3 | 2.1 | 9.12 | 0.12 | 44.8 | 0.4 |
| Aug. 8 | 30.52 | 0.22 | 17.3 | 0.7 | 24.51 | 0.17 | 21.2 | 2.0 | 9.24 | 0.14 | 45.2 | 0.3 |
| 18 | 30.74 | 0.26 | 16.6 | 0.7 | 24.68 | 0.18 | 19.2 | 1.7 | 9.38 | 0.17 | 45.5 | 0.1 |
| 28 | 31.00 | 0.27 | 15.9 | 0.8 | 24.86 | 0.22 | 17.5 | 1.3 | 9.55 | 0.19 | 45.6 | 0.1 |
| Sept. 7 | 31.27 | 0.31 | 15.1 | 0.8 | 25.08 | 0.24 | 16.2 | 0.7 | 9.74 | 0.21 | 45.5 | 0.3 |
| 17 | 31.58 | 0.31 | 14.3 | 0.8 | 25.32 | 0.27 | 15.5 | 0.4 | 9.95 | 0.25 | 45.2 | 0.6 |
| 27 | 31.89 | 0.34 | 13.5 | 0.9 | 25.59 | 0.30 | 15.1 | 0.1 | 10.20 | 0.27 | 44.6 | 0.8 |
| Oct. 7 | 32.23 | 0.35 | 12.6 | 0.9 | 25.89 | 0.32 | 15.2 | 0.6 | 10.47 | 0.29 | 43.8 | 1.0 |
| 17 | 32.58 | 0.36 | 11.7 | 0.8 | 26.21 | 0.32 | 15.8 | 1.0 | 10.76 | 0.31 | 42.8 | 1.2 |
| 27 | 32.94 | 0.36 | 10.9 | 0.8 | 26.53 | 0.32 | 16.8 | 1.5 | 11.07 | 0.33 | 41.6 | 1.5 |
| Nov. 6 | 33.30 | 0.36 | 10.1 | 0.7 | 26.85 | 0.33 | 18.3 | 1.8 | 11.40 | 0.34 | 40.1 | 1.5 |
| 16 | 33.66 | 0.35 | 9.4 | 0.7 | 27.18 | 0.31 | 20.1 | 2.2 | 11.74 | 0.33 | 38.6 | 1.6 |
| 26 | 34.01 | 0.32 | 8.7 | 0.5 | 27.49 | 0.30 | 22.3 | 2.5 | 12.07 | 0.32 | 37.0 | 1.7 |
| Dec. 6 | 34.33 | 0.29 | 8.2 | 0.3 | 27.79 | 0.27 | 24.8 | 2.6 | 12.39 | 0.30 | 35.3 | 1.6 |
| 16 | 34.62 | 0.27 | 7.9 | 0.1 | 28.06 | 0.23 | 27.4 | 2.7 | 12.69 | 0.28 | 33.7 | 1.6 |
| 26 | 34.89 | 0.20 | 7.8 | 0.0 | 28.29 | 0.18 | 30.1 | 2.7 | 12.97 | 0.23 | 32.1 | 1.5 |
| 36 | 35.09 | | 7.8 | | 28.47 | | 32.8 | | 13.20 | | 30.6 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | ι Ursæ Majoris. | | | | ι Argus. | | | | α Hydræ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 8 | m. 49 | ° 48 | ′ 35 | h. 9 | m. 13 | ° 58 | ′ 40 | h. 9 | m 20 | ° 8 | ′ 2 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 21.06 | 0.31 | 71.2 | 0.9 | 15.29 | 0.27 | 1.3 | 3.5 | 31.13 | 0.23 | 4.2 | 2.2 |
| 11 | 21.37 | 0.25 | 72.1 | 1.2 | 15.56 | 0.20 | 4.8 | 3.7 | 31.36 | 0.19 | 6.4 | 2.1 |
| 21 | 21.62 | 0.18 | 73.3 | 1.4 | 15.76 | 0.11 | 8.5 | 3.7 | 31.55 | 0.15 | 8.5 | 2.0 |
| 31 | 21.80 | 0.10 | 74.7 | 1.6 | 15.87 | 0.05 | 12.2 | 3.7 | 31.70 | 0.10 | 10.5 | 1.8 |
| Feb. 10 | 21.90 | 0.05 | 76.3 | 1.7 | 15.92 | 0.05 | 15.9 | 3.5 | 31.80 | 0.05 | 12.3 | 1.5 |
| 20 | 21.95 | 0.04 | 78.0 | 1.8 | 15.87 | 0.12 | 19.4 | 3.3 | 31.85 | 0.01 | 13.8 | 1.3 |
| March 1 | 21.91 | 0.10 | 79.8 | 1.7 | 15.75 | 0.19 | 22.7 | 3.0 | 31.86 | 0.04 | 15.1 | 1.1 |
| 11 | 21.81 | 0.15 | 81.5 | 1.6 | 15.56 | 0.25 | 25.7 | 2.7 | 31.82 | 0.08 | 16.2 | 0.8 |
| 21 | 21.66 | 0.19 | 83.1 | 1.4 | 15.31 | 0.29 | 28.4 | 2.3 | 31.74 | 0.11 | 17.0 | 0.6 |
| 31 | 21.47 | 0.21 | 84.5 | 1.2 | 15.02 | 0.33 | 30.7 | 1.9 | 31.63 | 0.12 | 17.6 | 0.3 |
| April 10 | 21.26 | 0.23 | 85.7 | 0.9 | 14.69 | 0.36 | 32.6 | 1.4 | 31.51 | 0.13 | 17.9 | 0.1 |
| 20 | 21.03 | 0.24 | 86.6 | 0.5 | 14.33 | 0.36 | 34.0 | 0.8 | 31.38 | 0.14 | 18.0 | 0.1 |
| 30 | 20.79 | 0.22 | 87.1 | 0.2 | 13.97 | 0.36 | 34.8 | 0.3 | 31.24 | 0.13 | 17.9 | 0.3 |
| May 10 | 20.57 | 0.19 | 87.3 | 0.2 | 13.61 | 0.35 | 35.1 | 0.2 | 31.11 | 0.12 | 17.6 | 0.6 |
| 20 | 20.38 | 0.16 | 87.1 | 0.5 | 13.26 | 0.34 | 34.9 | 0.8 | 30.99 | 0.11 | 17.0 | 0.7 |
| 30 | 20.22 | 0.13 | 86.6 | 0.8 | 12.92 | 0.30 | 34.1 | 1.2 | 30.88 | 0.08 | 16.3 | 0.8 |
| June 9 | 20.09 | 0.08 | 85.8 | 1.2 | 12.62 | 0.27 | 32.9 | 1.7 | 30.80 | 0.07 | 15.5 | 1.0 |
| 19 | 20.01 | 0.06 | 84.6 | 1.5 | 12.35 | 0.23 | 31.2 | 2.1 | 30.73 | 0.05 | 14.5 | 1.1 |
| 29 | 19.95 | 0.00 | 83.1 | 1.7 | 12.12 | 0.19 | 29.1 | 2.5 | 30.68 | 0.02 | 13.4 | 1.2 |
| July 9 | 19.95 | 0.05 | 81.4 | 1.8 | 11.93 | 0.13 | 26.6 | 2.8 | 30.66 | 0.01 | 12.2 | 1.2 |
| 19 | 20.00 | 0.10 | 79.6 | 1.9 | 11.80 | 0.07 | 23.8 | 3.0 | 30.67 | 0.03 | 11.0 | 1.3 |
| 29 | 20.10 | 0.14 | 77.7 | 2.0 | 11.73 | 0.00 | 20.8 | 3.1 | 30.70 | 0.06 | 9.7 | 1.1 |
| Aug. 8 | 20.24 | 0.18 | 75.7 | 2.2 | 11.73 | 0.06 | 17.7 | 3.0 | 30.76 | 0.08 | 8.6 | 1.0 |
| 18 | 20.42 | 0.23 | 73.5 | 2.2 | 11.79 | 0.12 | 14.7 | 2.9 | 30.84 | 0.12 | 7.6 | 0.9 |
| 28 | 20.65 | 0.26 | 71.3 | 2.2 | 11.91 | 0.19 | 11.8 | 2.6 | 30.96 | 0.16 | 6.7 | 0.6 |
| Sept. 7 | 20.91 | 0.31 | 69.1 | 2.1 | 12.10 | 0.27 | 9.2 | 2.2 | 31.12 | 0.18 | 6.1 | 0.4 |
| 17 | 21.22 | 0.36 | 67.0 | 2.0 | 12.37 | 0.32 | 7.0 | 1.8 | 31.30 | 0.21 | 5.7 | 0.0 |
| 27 | 21.58 | 0.37 | 65.0 | 2.0 | 12.69 | 0.38 | 5.2 | 1.3 | 31.51 | 0.24 | 5.7 | 0.4 |
| Oct. 7 | 21.95 | 0.41 | 63.0 | 1.8 | 13.07 | 0.44 | 3.9 | 0.7 | 31.75 | 0.27 | 6.1 | 0.6 |
| 17 | 22.36 | 0.44 | 61.2 | 1.5 | 13.51 | 0.46 | 3.2 | 0.1 | 32.02 | 0.29 | 6.7 | 1.0 |
| 27 | 22.80 | 0.47 | 59.7 | 1.3 | 13.97 | 0.49 | 3.1 | 0.5 | 32.31 | 0.31 | 7.7 | 1.4 |
| Nov. 6 | 23.27 | 0.47 | 58.4 | 1.1 | 14.46 | 0.50 | 3.6 | 1.3 | 32.62 | 0.33 | 9.1 | 1.7 |
| 16 | 23.74 | 0.47 | 57.3 | 0.7 | 14.96 | 0.51 | 4.9 | 1.8 | 32.95 | 0.34 | 10.8 | 1.9 |
| 26 | 24.21 | 0.46 | 56.6 | 0.4 | 15.47 | 0.48 | 6.7 | 2.3 | 33.29 | 0.32 | 12.7 | 2.0 |
| Dec. 6 | 24.67 | 0.43 | 56.2 | 0.0 | 15.95 | 0.43 | 9.0 | 2.8 | 33.61 | 0.32 | 14.7 | 2.2 |
| 16 | 25.10 | 0.40 | 56.2 | 0.3 | 16.38 | 0.40 | 11.8 | 3.2 | 33.93 | 0.30 | 16.9 | 2.3 |
| 26 | 25.50 | 0.35 | 56.5 | 0.6 | 16.78 | 0.32 | 15.0 | 3.4 | 34.23 | 0.26 | 19.2 | 2.2 |
| 36 | 25.85 | | 57.1 | | 17.10 | | 18.4 | | 34.49 | | 21.4 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | ϑ Ursæ Majoris. | | | | ι Leonis. | | | | α Leonis. (*Regulus.*) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 9 | m. 23 | ° 52 | ′ 19 | h. 9 | m. 37 | ° 24 | ′ 25 | h. 10 | m. 0 | ° 12 | ′ 39 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 13.50 | 0.37 | 45.7 | 0.8 | 40.92 | 0.29 | 65.9 | 0.6 | 42.39 | 0.29 | 71.0 | 1.3 |
| 11 | 13.87 | 0.32 | 46.5 | 1.1 | 41.21 | 0.24 | 65.3 | 0.4 | 42.68 | 0.24 | 69.7 | 1.2 |
| 21 | 14.19 | 0.23 | 47.6 | 1.3 | 41.45 | 0.19 | 64.9 | 0.2 | 42.92 | 0.19 | 68.5 | 1.0 |
| 31 | 14.42 | 0.16 | 48.9 | 1.6 | 41.64 | 0.14 | 64.7 | 0.0 | 43.11 | 0.16 | 67.5 | 0.7 |
| Feb. 10 | 14.58 | 0.07 | 50.5 | 1.9 | 41.78 | 0.08 | 64.7 | 0.3 | 43.27 | 0.11 | 66.8 | 0.4 |
| 20 | 14.65 | 0.01 | 52.4 | 2.2 | 41.86 | 0.04 | 65.0 | 0.6 | 43.38 | 0.05 | 66.4 | 0.2 |
| March 1 | 14.66 | 0.07 | 54.6 | 2.1 | 41.90 | 0.02 | 65.6 | 0.7 | 43.43 | 0.01 | 66.2 | 0.1 |
| 11 | 14.59 | 0.13 | 56.7 | 1.8 | 41.88 | 0.06 | 66.3 | 0.8 | 43.44 | 0.04 | 66.3 | 0.2 |
| 21 | 14.46 | 0.18 | 58.5 | 1.7 | 41.82 | 0.09 | 67.1 | 0.8 | 43.40 | 0.07 | 66.5 | 0.4 |
| 31 | 14.28 | 0.22 | 60.2 | 1.6 | 41.73 | 0.12 | 67.9 | 0.9 | 43.33 | 0.09 | 66.9 | 0.4 |
| April 10 | 14.06 | 0.24 | 61.8 | 1.2 | 41.61 | 0.13 | 68.8 | 0.8 | 43.24 | 0.11 | 67.3 | 0.5 |
| 20 | 13.82 | 0.24 | 63.0 | 0.8 | 41.48 | 0.13 | 69.6 | 0.8 | 43.13 | 0.12 | 67.8 | 0.6 |
| 30 | 13.58 | 0.25 | 63.8 | 0.4 | 41.35 | 0.15 | 70.4 | 0.6 | 43.01 | 0.12 | 68.4 | 0.6 |
| May 10 | 13.33 | 0.23 | 64.2 | 0.2 | 41.20 | 0.13 | 71.0 | 0.5 | 42.89 | 0.12 | 69.0 | 0.6 |
| 20 | 13.10 | 0.22 | 64.4 | 0.3 | 41.07 | 0.12 | 71.5 | 0.3 | 42.77 | 0.11 | 69.6 | 0.5 |
| 30 | 12.88 | 0.18 | 64.1 | 0.8 | 40.95 | 0.09 | 71.8 | 0.2 | 42.66 | 0.09 | 70.1 | 0.5 |
| June 9 | 12.70 | 0.13 | 63.3 | 1.1 | 40.86 | 0.08 | 72.0 | 0.0 | 42.57 | 0.08 | 70.6 | 0.4 |
| 19 | 12.57 | 0.09 | 62.2 | 1.4 | 40.78 | 0.05 | 72.0 | 0.1 | 42.49 | 0.07 | 71.0 | 0.4 |
| 29 | 12.48 | 0.06 | 60.8 | 1.7 | 40.73 | 0.04 | 71.9 | 0.2 | 42.42 | 0.04 | 71.4 | 0.3 |
| July 9 | 12.42 | 0.01 | 59.1 | 1.9 | 40.69 | 0.02 | 71.7 | 0.5 | 42.38 | 0.01 | 71.7 | 0.1 |
| 19 | 12.41 | 0.04 | 57.2 | 2.2 | 40.71 | 0.03 | 71.2 | 0.7 | 42.37 | 0.01 | 71.8 | 0.0 |
| 29 | 12.45 | 0.09 | 55.0 | 2.3 | 40.74 | 0.06 | 70.5 | 0.8 | 42.38 | 0.03 | 71.8 | 0.1 |
| Aug. 8 | 12.54 | 0.14 | 52.7 | 2.5 | 40.80 | 0.09 | 69.7 | 0.9 | 42.41 | 0.07 | 71.7 | 0.3 |
| 18 | 12.68 | 0.19 | 50.2 | 2.6 | 40.89 | 0.12 | 68.8 | 1.1 | 42.48 | 0.09 | 71.4 | 0.5 |
| 28 | 12.87 | 0.22 | 47.6 | 2.6 | 41.01 | 0.16 | 67.7 | 1.3 | 42.57 | 0.12 | 70.9 | 0.6 |
| Sept. 7 | 13.09 | 0.28 | 45.0 | 2.5 | 41.17 | 0.19 | 66.4 | 1.4 | 42.69 | 0.15 | 70.3 | 0.8 |
| 17 | 13.37 | 0.32 | 42.5 | 2.5 | 41.36 | 0.21 | 65.0 | 1.5 | 42.84 | 0.18 | 69.5 | 1.0 |
| 27 | 13.69 | 0.36 | 40.0 | 2.4 | 41.57 | 0.25 | 63.5 | 1.6 | 43.02 | 0.21 | 68.5 | 1.2 |
| Oct. 7 | 14.05 | 0.41 | 37.6 | 2.2 | 41.82 | 0.30 | 61.9 | 1.7 | 43.23 | 0.26 | 67.3 | 1.5 |
| 17 | 14.46 | 0.45 | 35.4 | 2.0 | 42.12 | 0.30 | 60.2 | 1.9 | 43.49 | 0.28 | 65.8 | 1.7 |
| 27 | 14.91 | 0.48 | 33.4 | 1.7 | 42.42 | 0.34 | 58.3 | 1.8 | 43.77 | 0.30 | 64.1 | 1.8 |
| Nov. 6 | 15.39 | 0.49 | 31.7 | 1.4 | 42.76 | 0.36 | 56.5 | 1.7 | 44.07 | 0.34 | 62.3 | 1.8 |
| 16 | 15.88 | 0.50 | 30.3 | 1.1 | 43.12 | 0.36 | 54.8 | 1.6 | 44.41 | 0.34 | 60.5 | 1.9 |
| 26 | 16.38 | 0.49 | 29.2 | 0.7 | 43.48 | 0.36 | 53.2 | 1.6 | 44.75 | 0.34 | 58.6 | 1.9 |
| Dec. 6 | 16.87 | 0.49 | 28.5 | 0.2 | 43.84 | 0.36 | 51.6 | 1.4 | 45.09 | 0.34 | 56.7 | 1.8 |
| 16 | 17.36 | 0.45 | 28.3 | 0.0 | 44.20 | 0.35 | 50.2 | 1.2 | 45.43 | 0.34 | 54.9 | 1.7 |
| 26 | 17.81 | 0.41 | 28.3 | 0.4 | 44.55 | 0.30 | 49.0 | 0.9 | 45.77 | 0.29 | 53.2 | 1.5 |
| 36 | 18.22 | | 28.7 | | 44.85 | | 48.1 | | 46.06 | | 51.7 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | η Argus. | | | | α Ursæ Majoris. | | | | δ Leonis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 10 | m. 39 | ° 58 | ' 55 | h. 10 | m. 54 | ° 62 | ' 31 | h. 11 | m. 6 | ° 21 | ' 18 |
| | s. | s. | " | " | s. | s. | " | " | s. | s. | " | " |
| Jan. 1 | 29.21 | 0.42 | 20.3 | 3.0 | 49.91 | 0.58 | 26.3 | 0.2 | 26.92 | 0.34 | 39.8 | 1.4 |
| 11 | 29.63 | 0.36 | 23.3 | 3.3 | 50.49 | 0.51 | 26.5 | 0.7 | 27.26 | 0.31 | 38.4 | 1.1 |
| 21 | 29.99 | 0.29 | 26.6 | 3.6 | 51.00 | 0.45 | 27.2 | 1.3 | 27.57 | 0.26 | 37.3 | 0.8 |
| 31 | 30.28 | 0.21 | 30.2 | 3.7 | 51.45 | 0.36 | 28.5 | 1.7 | 27.83 | 0.22 | 36.5 | 0.4 |
| Feb. 10 | 30.49 | 0.13 | 33.9 | 3.7 | 51.81 | 0.27 | 30.2 | 2.0 | 28.05 | 0.18 | 36.1 | 0.1 |
| 20 | 30.62 | 0.06 | 37.6 | 3.7 | 52.08 | 0.16 | 32.2 | 2.3 | 28.23 | 0.13 | 36.2 | 0.1 |
| March 1 | 30.68 | 0.02 | 41.3 | 3.5 | 52.24 | 0.08 | 34.5 | 2.5 | 28.36 | 0.07 | 36.3 | 0.4 |
| 11 | 30.66 | 0.08 | 44.8 | 3.4 | 52.32 | 0.01 | 37.0 | 2.7 | 28.43 | 0.03 | 36.7 | 0.8 |
| 21 | 30.58 | 0.14 | 48.2 | 3.1 | 52.31 | 0.11 | 39.7 | 2.6 | 28.46 | 0.01 | 37.5 | 0.9 |
| 31 | 30.44 | 0.19 | 51.3 | 2.8 | 52.20 | 0.18 | 42.3 | 2.3 | 28.45 | 0.04 | 38.4 | 0.9 |
| April 10 | 30.25 | 0.24 | 54.1 | 2.3 | 52.02 | 0.23 | 44.6 | 2.1 | 28.41 | 0.08 | 39.3 | 1.0 |
| 20 | 30.01 | 0.27 | 56.4 | 2.0 | 51.79 | 0.29 | 46.7 | 2.0 | 28.33 | 0.09 | 40.3 | 1.1 |
| 30 | 29.74 | 0.29 | 58.4 | 1.5 | 51.50 | 0.31 | 48.7 | 1.5 | 28.24 | 0.09 | 41.4 | 1.0 |
| May 10 | 29.45 | 0.31 | 59.9 | 1.0 | 51.19 | 0.33 | 50.2 | 1.0 | 28.15 | 0.11 | 42.4 | 0.9 |
| 20 | 29.14 | 0.32 | 60.9 | 0.5 | 50.86 | 0.34 | 51.2 | 0.4 | 28.04 | 0.12 | 43.3 | 0.7 |
| 30 | 28.82 | 0.32 | 61.4 | 0.0 | 50.52 | 0.32 | 51.6 | 0.0 | 27.92 | 0.12 | 44.0 | 0.7 |
| June 9 | 28.50 | 0.30 | 61.4 | 0.5 | 50.20 | 0.31 | 51.6 | 0.4 | 27.80 | 0.10 | 44.7 | 0.4 |
| 19 | 28.20 | 0.29 | 60.9 | 1.1 | 49.89 | 0.28 | 51.2 | 1.0 | 27.70 | 0.10 | 45.1 | 0.2 |
| 29 | 27.91 | 0.28 | 59.8 | 1.6 | 49.61 | 0.24 | 50.2 | 1.5 | 27.60 | 0.08 | 45.3 | 0.1 |
| July 9 | 27.63 | 0.22 | 58.2 | 2.0 | 49.37 | 0.20 | 48.7 | 2.0 | 27.52 | 0.06 | 45.4 | 0.2 |
| 19 | 27.41 | 0.19 | 56.2 | 2.3 | 49.17 | 0.16 | 46.7 | 2.3 | 27.46 | 0.05 | 45.2 | 0.4 |
| 29 | 27.22 | 0.14 | 53.9 | 2.6 | 49.01 | 0.11 | 44.4 | 2.6 | 27.41 | 0.02 | 44.8 | 0.6 |
| Aug. 8 | 27.08 | 0.08 | 51.3 | 2.8 | 48.90 | 0.03 | 41.8 | 2.8 | 27.39 | 0.00 | 44.2 | 0.8 |
| 18 | 27.00 | 0.02 | 48.5 | 2.9 | 48.87 | 0.01 | 39.0 | 3.1 | 27.39 | 0.02 | 43.4 | 1.1 |
| 28 | 26.98 | 0.04 | 45.6 | 2.8 | 48.88 | 0.08 | 35.9 | 3.3 | 27.41 | 0.04 | 42.3 | 1.2 |
| Sept. 7 | 27.02 | 0.11 | 42.8 | 2.6 | 48.96 | 0.16 | 32.6 | 3.4 | 27.45 | 0.09 | 41.1 | 1.5 |
| 17 | 27.13 | 0.19 | 40.2 | 2.4 | 49.12 | 0.21 | 29.2 | 3.4 | 27.54 | 0.13 | 39.6 | 1.7 |
| 27 | 27.32 | 0.28 | 37.8 | 2.1 | 49.33 | 0.28 | 25.8 | 3.3 | 27.67 | 0.16 | 37.9 | 1.9 |
| Oct. 7 | 27.60 | 0.35 | 35.7 | 1.6 | 49.61 | 0.36 | 22.5 | 3.3 | 27.83 | 0.20 | 36.0 | 2.0 |
| 17 | 27.95 | 0.41 | 34.1 | 1.0 | 49.97 | 0.42 | 19.2 | 3.0 | 28.03 | 0.24 | 34.0 | 2.0 |
| 27 | 28.36 | 0.45 | 33.1 | 0.4 | 50.39 | 0.49 | 16.2 | 2.9 | 28.27 | 0.28 | 32.0 | 2.2 |
| Nov. 6 | 28.81 | 0.50 | 32.7 | 0.0 | 50.88 | 0.54 | 13.3 | 2.5 | 28.55 | 0.32 | 29.8 | 2.3 |
| 16 | 29.31 | 0.53 | 32.7 | 0.8 | 51.42 | 0.59 | 10.8 | 2.1 | 28.87 | 0.34 | 27.5 | 2.3 |
| 26 | 29.84 | 0.53 | 33.5 | 1.3 | 52.01 | 0.61 | 8.7 | 1.6 | 29.21 | 0.35 | 25.2 | 2.1 |
| Dec. 6 | 30.37 | 0.52 | 34.8 | 1.8 | 52.62 | 0.62 | 7.1 | 1.1 | 29.56 | 0.36 | 23.1 | 2.0 |
| 16 | 30.89 | 0.50 | 36.6 | 2.4 | 53.24 | 0.62 | 6.0 | 0.7 | 29.92 | 0.37 | 21.1 | 1.8 |
| 26 | 31.39 | 0.46 | 39.0 | 2.8 | 53.86 | 0.60 | 5.3 | 0.1 | 30.29 | 0.35 | 19.3 | 1.5 |
| 36 | 31.85 | | 41.8 | | 54.46 | | 5.2 | | 30.64 | | 17.8 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | δ Hydræ et Crateris. Right Ascension. | δ Hydræ et Crateris. Dec. *South.* | β Leonis. Right Ascension. | β Leonis. Dec. *North.* | γ Ursæ Majoris. Right Ascension. | γ Ursæ Majoris. Dec. *North.* |
|---|---|---|---|---|---|---|
| | h. m.<br>11 12 | ° ′<br>13 59 | h. m.<br>11 41 | ° ′<br>15 22 | h. m.<br>11 46 | ° ′<br>54 29 |
| | s. s. | ″ ″ | s. s. | ″ ″ | s. s. | ″ ″ |
| Jan. 1 | 8.50 0.32 | 51.7 2.5 | 42.65 0.34 | 34.2 1.7 | 14.89 0.51 | 29.7 0.6 |
| 11 | 8.82 0.29 | 54.2 2.4 | 42.99 0.32 | 32.5 1.5 | 15.40 0.47 | 29.1 0.1 |
| 21 | 9.11 0.24 | 56.6 2.3 | 43.31 0.28 | 31.0 1.2 | 15.87 0.42 | 29.0 0.5 |
| 31 | 9.35 0.21 | 58.9 2.3 | 43.59 0.24 | 29.8 0.8 | 16.29 0.36 | 29.5 0.9 |
| Feb. 10 | 9.56 0.17 | 61.2 2.1 | 43.83 0.20 | 29.0 0.6 | 16.65 0.30 | 30.4 1.4 |
| 20 | 9.73 0.12 | 63.3 1.8 | 44.03 0.16 | 28.4 0.4 | 16.95 0.23 | 31.8 1.7 |
| March 1 | 9.85 0.07 | 65.1 1.6 | 44.19 0.10 | 28.0 0.2 | 17.18 0.15 | 33.5 2.1 |
| 11 | 9.92 0.02 | 66.7 1.4 | 44.29 0.06 | 28.2 0.5 | 17.33 0.08 | 35.6 2.4 |
| 21 | 9.94 0.00 | 68.1 1.1 | 44.35 0.04 | 28.7 0.6 | 17.41 0.02 | 38.0 2.5 |
| 31 | 9.94 0.04 | 69.2 0.8 | 44.39 0.01 | 29.3 0.7 | 17.43 0.06 | 40.5 2.4 |
| April 10 | 9.90 0.07 | 70.0 0.6 | 44.38 0.04 | 30.0 0.9 | 17.37 0.11 | 42.9 2.4 |
| 20 | 9.83 0.08 | 70.6 0.5 | 44.34 0.06 | 30.9 0.9 | 17.26 0.15 | 45.3 2.2 |
| 30 | 9.75 0.08 | 71.1 0.3 | 44.28 0.08 | 31.8 1.0 | 17.11 0.19 | 47.5 1.9 |
| May 10 | 9.67 0.10 | 71.4 0.1 | 44.20 0.09 | 32.8 0.9 | 16.92 0.22 | 49.4 1.6 |
| 20 | 9.57 0.11 | 71.5 0.3 | 44.11 0.10 | 33.7 0.9 | 16.70 0.23 | 51.0 1.3 |
| 30 | 9.46 0.11 | 71.2 0.5 | 44.01 0.10 | 34.6 0.7 | 16.47 0.24 | 52.3 0.6 |
| June 9 | 9.35 0.10 | 70.7 0.6 | 43.91 0.10 | 35.3 0.6 | 16.23 0.25 | 52.9 0.3 |
| 19 | 9.25 0.10 | 70.1 0.8 | 43.81 0.10 | 35.9 0.5 | 15.98 0.23 | 53.2 0.3 |
| 29 | 9.15 0.09 | 69.3 1.0 | 43.71 0.09 | 36.4 0.3 | 15.75 0.23 | 52.9 0.7 |
| July 9 | 9.06 0.07 | 68.3 1.2 | 43.62 0.09 | 36.7 0.1 | 15.52 0.21 | 52.2 1.2 |
| 19 | 8.99 0.06 | 67.1 1.2 | 43.53 0.07 | 36.8 0.1 | 15.31 0.17 | 51.0 1.6 |
| 29 | 8.93 0.05 | 65.9 1.1 | 43.46 0.06 | 36.7 0.2 | 15.14 0.14 | 49.4 2.0 |
| Aug. 8 | 8.88 0.04 | 64.8 1.1 | 43.40 0.03 | 36.5 0.5 | 15.00 0.10 | 47.4 2.4 |
| 18 | 8.84 0.03 | 63.7 1.0 | 43.37 0.01 | 36.0 0.7 | 14.90 0.05 | 45.0 2.6 |
| 28 | 8.87 0.05 | 62.7 0.8 | 43.36 0.01 | 35.3 0.9 | 14.85 0.01 | 42.4 2.9 |
| Sept. 7 | 8.92 0.07 | 61.9 0.7 | 43.37 0.05 | 34.4 1.1 | 14.84 0.02 | 39.5 3.1 |
| 17 | 8.99 0.10 | 61.2 0.4 | 43 42 0.08 | 33.3 1.4 | 14.86 0.09 | 36.4 3.3 |
| 27 | 9.09 0.15 | 60.8 0.1 | 43.50 0.12 | 31.9 1.6 | 14.95 0.15 | 33.1 3.4 |
| Oct. 7 | 9.24 0.20 | 60.7 0.4 | 43.62 0.16 | 30.3 1.8 | 15.10 0.21 | 29.7 3.4 |
| 17 | 9.44 0.23 | 61.1 0.6 | 43.78 0.20 | 28.5 2.0 | 15.31 0.27 | 26.3 3.3 |
| 27 | 9.67 0.26 | 61.7 0.9 | 43.98 0.24 | 26.5 2.1 | 15.58 0.33 | 23.0 3.2 |
| Nov. 6 | 9.93 0.31 | 62.6 1.4 | 44.22 0.28 | 24.4 2.3 | 15.91 0.38 | 19.8 3.1 |
| 16 | 10.24 0.32 | 64.0 1.6 | 44.50 0.31 | 22.1 2.3 | 16.29 0.44 | 16.7 2.7 |
| 26 | 10.56 0.34 | 65.6 1.9 | 44.81 0.34 | 19.8 2.2 | 16.73 0.48 | 14.0 2.4 |
| Dec. 6 | 10.90 0.36 | 67.5 2.1 | 45.15 0.35 | 17.6 2.2 | 17.21 0.50 | 11.6 2.1 |
| 16 | 11.26 0.36 | 69.6 2.3 | 45.50 0.36 | 15.4 2.1 | 17.71 0.51 | 9.5 1.3 |
| 26 | 11.62 0.32 | 71.9 2.3 | 45.86 0.35 | 13.3 1.9 | 18.22 0.51 | 8.2 0.9 |
| 36 | 11.94 | 74.2 | 46.21 | 11.4 | 18.73 | 7.3 |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Chamæleontis. | | | | α¹ Crucis. | | | | β Corvi. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 12 | m. 9 | ° 78 | ′ 30 | h. 12 | m. 18 | ° 62 | ′ 17 | h. 12 | m. 26 | ° 22 | ′ 35 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 57.23 | 1.17 | 23.0 | 1.8 | 35.85 | 0.57 | 40.3 | 2.1 | 49.06 | 0.35 | 50.7 | 2.2 |
| 11 | 58.40 | 1.09 | 24.8 | 2.3 | 36.42 | 0.55 | 42.4 | 2.5 | 49.41 | 0.34 | 52.9 | 2.3 |
| 21 | 59.49 | 0.97 | 27.1 | 2.7 | 36.97 | 0.50 | 44.9 | 2.9 | 49.75 | 0.32 | 55.2 | 2.4 |
| 31 | 60.46 | 0.83 | 29.8 | 3.1 | 37.47 | 0.42 | 47.8 | 3.1 | 50.07 | 0.27 | 57.6 | 2.5 |
| Feb. 10 | 61.29 | 0.67 | 32.9 | 3.6 | 37.89 | 0.36 | 50.9 | 3.4 | 50.34 | 0.23 | 60.1 | 2.3 |
| 20 | 61.96 | 0.52 | 36.5 | 3.7 | 38.25 | 0.29 | 54.3 | 3.4 | 50.57 | 0.20 | 62.4 | 2.2 |
| March 1 | 62.48 | 0.35 | 40.2 | 3.7 | 38.54 | 0.21 | 57.7 | 3.5 | 50.77 | 0.16 | 64.6 | 2.1 |
| 11 | 62.83 | 0.18 | 43.9 | 3.9 | 38.75 | 0.12 | 61.2 | 3.4 | 50.93 | 0.12 | 66.7 | 1.9 |
| 21 | 63.01 | 0.02 | 47.8 | 3.9 | 38.87 | 0.05 | 64.6 | 3.4 | 51.05 | 0.07 | 68.6 | 1.6 |
| 31 | 63.03 | 0.15 | 51.7 | 3.7 | 38.92 | 0.02 | 68.0 | 3.1 | 51.12 | 0.03 | 70.2 | 1.5 |
| April 10 | 62.88 | 0.30 | 55.4 | 3.6 | 38.94 | 0.06 | 71.1 | 2.9 | 51.15 | 0.02 | 71.7 | 1.3 |
| 20 | 62.58 | 0.42 | 59.0 | 3.3 | 38.88 | 0.12 | 74.0 | 2.6 | 51.17 | 0.02 | 73.0 | 1.0 |
| 30 | 62.16 | 0.55 | 62.3 | 2.9 | 38.76 | 0.17 | 76.6 | 2.3 | 51.15 | 0.05 | 74.0 | 0.7 |
| May 10 | 61.61 | 0.68 | 65.2 | 2.6 | 38.59 | 0.22 | 78.9 | 1.9 | 51.10 | 0.06 | 74.7 | 0.6 |
| 20 | 60.93 | 0.77 | 67.8 | 2.1 | 38.37 | 0.26 | 80.8 | 1.5 | 51.04 | 0.08 | 75.3 | 0.3 |
| 30 | 60.16 | 0.84 | 69.9 | 1.7 | 38.11 | 0.29 | 82.3 | 1.1 | 50.96 | 0.09 | 75.6 | 0.0 |
| June 9 | 59.32 | 0.89 | 71.6 | 1.1 | 37.82 | 0.31 | 83.4 | 0.5 | 50.87 | 0.10 | 75.6 | 0.2 |
| 19 | 58.43 | 0.93 | 72.7 | 0.5 | 37.51 | 0.33 | 83.9 | 0.1 | 50.77 | 0.11 | 75.4 | 0.4 |
| 29 | 57.50 | 0.94 | 73.2 | 0.1 | 37.18 | 0.34 | 84.0 | 0.5 | 50.66 | 0.11 | 75.0 | 0.6 |
| July 9 | 56.56 | 0.93 | 73.1 | 0.7 | 36.84 | 0.33 | 83.5 | 0.9 | 50.55 | 0.11 | 74.4 | 0.8 |
| 19 | 55.63 | 0.87 | 72.4 | 1.3 | 36.51 | 0.32 | 82.6 | 1.4 | 50.44 | 0.11 | 73.6 | 1.0 |
| 29 | 54.76 | 0.79 | 71.1 | 1.7 | 36.19 | 0.30 | 81.2 | 1.8 | 50.33 | 0.10 | 72.6 | 1.2 |
| Aug. 8 | 53.97 | 0.70 | 69.4 | 2.3 | 35.89 | 0.25 | 79.4 | 2.1 | 50.23 | 0.09 | 71.4 | 1.2 |
| 18 | 53.27 | 0.55 | 67.1 | 2.5 | 35.64 | 0.21 | 77.3 | 2.3 | 50.14 | 0.07 | 70.2 | 1.1 |
| 28 | 52.72 | 0.39 | 64.6 | 2.7 | 35.43 | 0.14 | 75.0 | 2.5 | 50.07 | 0.03 | 69.1 | 1.1 |
| Sept. 7 | 52.33 | 0.19 | 61.9 | 2.9 | 35.29 | 0.06 | 72.5 | 2.6 | 50.04 | 0.00 | 68.0 | 1.1 |
| 17 | 52.14 | 0.01 | 59.0 | 3.1 | 35.23 | 0.02 | 69.9 | 2.5 | 50.04 | 0.02 | 66.9 | 0.9 |
| 27 | 52.13 | 0.18 | 55.9 | 2.9 | 35.25 | 0.10 | 67.4 | 2.4 | 50.06 | 0.07 | 66.0 | 0.7 |
| Oct. 7 | 52.31 | 0.41 | 53.0 | 2.8 | 35.35 | 0.20 | 65.0 | 2.1 | 50.13 | 0.13 | 65.3 | 0.7 |
| 17 | 52.72 | 0.60 | 50.2 | 2.3 | 35.55 | 0.28 | 62.9 | 1.7 | 50.26 | 0.17 | 64.6 | 0.3 |
| 27 | 53.32 | 0.81 | 47.9 | 2.0 | 35.83 | 0.38 | 61.2 | 1.3 | 50.43 | 0.22 | 64.3 | 0.5 |
| Nov. 6 | 54.13 | 0.94 | 45.9 | 1.4 | 36.21 | 0.45 | 59.9 | 0.8 | 50.65 | 0.26 | 64.8 | 1.0 |
| 16 | 55.07 | 1.09 | 44.5 | 1.0 | 36.66 | 0.50 | 59.1 | 0.3 | 50.91 | 0.30 | 65.8 | 1.0 |
| 26 | 56.16 | 1.18 | 43.5 | 0.3 | 37.16 | 0.58 | 58.8 | 0.3 | 51.21 | 0.34 | 66.8 | 1.3 |
| Dec. 6 | 57.34 | 1.22 | 43.2 | 0.3 | 37.74 | 0.61 | 59.1 | 0.8 | 51.55 | 0.36 | 68.1 | 1.7 |
| 16 | 58.56 | 1.26 | 43.5 | 0.9 | 38.35 | 0.60 | 59.9 | 1.4 | 51.91 | 0.37 | 69.8 | 2.0 |
| 26 | 59.82 | 1.20 | 44.4 | 1.4 | 38.95 | 0.60 | 61.3 | 1.9 | 52.28 | 0.36 | 71.8 | 2.1 |
| 36 | 61.02 | | 45.8 | | 39.55 | | 63.2 | | 52.64 | | 73.9 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | 12 Canum Venaticorum. | | α Virginis. (*Spica.*) | | η Ursæ Majoris. | |
|---|---|---|---|---|---|---|
| | **Right Ascension.** | **Dec.** ***North.*** | **Right Ascension.** | **Dec.** ***South.*** | **Right Ascension.** | **Dec.** ***North.*** |
| | h. m. | ° ′ | h. m. | ° ′ | h. m. | ° ′ |
| | 12 49 | 39 5 | 13 17 | 10 24 | 13 41 | 50 1 |
| | s. s. | ″ ″ | s. s. | ″ ″ | s. s. | ″ ″ |
| Jan. 1 | 16.90 0.41 | 36.8 1.9 | 35.83 0.35 | 27.5 2.1 | 51.27 0.45 | 43.5 2.0 |
| 11 | 17.31 0.41 | 34.9 1.2 | 36.18 0.34 | 29.6 2.1 | 51.72 0.45 | 41.5 1.4 |
| 21 | 17.72 0.37 | 33.7 0.6 | 36.52 0.33 | 31.7 2.0 | 52.17 0.45 | 40.1 0.9 |
| 31 | 18.09 0.33 | 33.1 0.3 | 36.85 0.29 | 33.7 1.9 | 52.62 0.42 | 39.2 0.3 |
| Feb. 10 | 18.42 0.30 | 32.8 0.3 | 37.14 0.27 | 35.6 1.8 | 53.04 0.38 | 38.9 0.4 |
| 20 | 18.72 0.25 | 33.1 0.7 | 37.41 0.23 | 37.4 1.6 | 53.42 0.35 | 39.3 1.0 |
| March 1 | 18.97 0.20 | 33.8 1.2 | 37.64 0.21 | 39.0 1.3 | 53.77 0.29 | 40.3 1.4 |
| 11 | 19.17 0.15 | 35.0 1.5 | 37.85 0.17 | 40.3 1.1 | 54.06 0.23 | 41.7 1.9 |
| 21 | 19.32 0.09 | 36.5 1.9 | 38.02 0.12 | 41.4 1.0 | 54.29 0.18 | 43.6 2.3 |
| 31 | 19.41 0.05 | 38.4 2.0 | 38.14 0.09 | 42.4 0.7 | 54.47 0.12 | 45.9 2.5 |
| April 10 | 19.46 0.03 | 40.4 2.1 | 38.23 0.07 | 43.1 0.5 | 54.59 0.06 | 48.4 2.6 |
| 20 | 19.49 0.05 | 42.5 2.2 | 38.30 0.03 | 43.6 0.3 | 54.65 0.01 | 51.0 2.6 |
| 30 | 19.44 0.07 | 44.7 2.1 | 38.33 0.01 | 43.9 0.2 | 54.66 0.04 | 53.6 2.6 |
| May 10 | 19.37 0.09 | 46.8 1.9 | 38.34 0.02 | 44.1 0.0 | 54.62 0.08 | 56.2 2.4 |
| 20 | 19.28 0.12 | 48.7 1.6 | 38.32 0.03 | 44.1 0.2 | 54.54 0.13 | 58.6 2.1 |
| 30 | 19.16 0.13 | 50.3 1.4 | 38.29 0.06 | 43.9 0.3 | 54.41 0.15 | 60.7 1.8 |
| June 9 | 19.03 0.15 | 51.7 1.1 | 38.23 0.07 | 43.6 0.4 | 54.26 0.18 | 62.5 1.4 |
| 19 | 18.88 0.16 | 52.8 0.7 | 38.16 0.09 | 43.2 0.4 | 54.08 0.21 | 63.9 1.3 |
| 29 | 18.72 0.16 | 53.5 0.1 | 38.07 0.10 | 42.8 0.5 | 53.87 0.22 | 65.0 0.6 |
| July 9 | 18.56 0.16 | 53.6 0.0 | 37.97 0.10 | 42.3 0.6 | 53.65 0.23 | 65.6 0.2 |
| 19 | 18.40 0.15 | 53.6 0.6 | 37.87 0.11 | 41.7 0.6 | 53.42 0.25 | 65.8 0.4 |
| 29 | 18.25 0.14 | 53.0 0.9 | 37.76 0.11 | 41.1 0.7 | 53.17 0.23 | 65.4 0.8 |
| Aug. 8 | 18.11 0.13 | 52.1 1.3 | 37.65 0.10 | 40.4 0.6 | 52.94 0.22 | 64.6 1.3 |
| 18 | 17.98 0.11 | 50.8 1.8 | 37.55 0.09 | 39.8 0.5 | 52.72 0.21 | 63.3 1.7 |
| 28 | 17.87 0.07 | 49.0 2.1 | 37.46 0.08 | 39.3 0.5 | 52.51 0.19 | 61.6 2.1 |
| Sept. 7 | 17.80 0.04 | 46.9 2.2 | 37.38 0.04 | 38.8 0.3 | 52.32 0.14 | 59.5 2.5 |
| 17 | 17.76 0.01 | 44.7 2.6 | 37.34 0.01 | 38.5 0.1 | 52.18 0.11 | 57.0 2.9 |
| 27 | 17.75 0.02 | 42.1 2.8 | 37.33 0.02 | 38.4 0.0 | 52.07 0.07 | 54.1 3.1 |
| Oct. 7 | 17.77 0.09 | 39.3 3.0 | 37.35 0.06 | 38.4 0.2 | 52.00 0.01 | 51.0 3.3 |
| 17 | 17.86 0.15 | 36.3 3.1 | 37.41 0.11 | 38.6 0.6 | 52.01 0.06 | 47.7 3.5 |
| 27 | 18.01 0.20 | 33.2 3.2 | 37.52 0.16 | 39.2 0.8 | 52.07 0.12 | 44.2 3.6 |
| Nov. 6 | 18.21 0.23 | 30.0 3.2 | 37.68 0.21 | 40.0 1.0 | 52.19 0.18 | 40.6 3.6 |
| 16 | 18.44 0.29 | 26.8 3.0 | 37.89 0.26 | 41.0 1.4 | 52.37 0.24 | 37.0 3.5 |
| 26 | 18.73 0.33 | 23.8 2.9 | 38.15 0.30 | 42.4 1.6 | 52.61 0.32 | 33.5 3.3 |
| Dec. 6 | 19.06 0.38 | 20.9 2.7 | 38.45 0.32 | 44.0 1.8 | 52.93 0.38 | 30.2 3.0 |
| 16 | 19.44 0.41 | 18.2 2.3 | 38.77 0.34 | 45.8 1.9 | 53.31 0.41 | 27.2 2.7 |
| 26 | 19.85 0.40 | 15.9 1.9 | 39.11 0.34 | 47.7 2.0 | 53.72 0.44 | 24.5 2.3 |
| 36 | 20.25 | 14.0 | 39.45 | 49.7 | 54.16 | 22.2 |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | η Bootis. | | | | β Centauri. | | | | α Bootis. (*Arcturus.*) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | |
| | h. 13 | m. 47 | 19° | 6′ | h. 13 | m. 53 | 59° | 40′ | h. 14 | m. 9 | 19° | 55′ |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 48.96 | 0.34 | 68.3 | 2.2 | 39.80 | 0.58 | 16.8 | 0.8 | 4.77 | 0.34 | 53.5 | 2.4 |
| 11 | 49.30 | 0.35 | 66.1 | 1.9 | 40.38 | 0.59 | 17.6 | 1.3 | 5.11 | 0.35 | 51.1 | 2.1 |
| 21 | 49.65 | 0.34 | 64.2 | 1.6 | 40.97 | 0.56 | 18.9 | 1.7 | 5.46 | 0.35 | 49.0 | 1.7 |
| 31 | 49.99 | 0.32 | 62.6 | 1.2 | 41.53 | 0.53 | 20.6 | 2.1 | 5.81 | 0.32 | 47.3 | 1.3 |
| Feb. 10 | 50.31 | 0.30 | 61.4 | 0.8 | 42.06 | 0.50 | 22.7 | 2.4 | 6.13 | 0.30 | 46.0 | 0.9 |
| 20 | 50.61 | 0.26 | 60.6 | 0.4 | 42.56 | 0.44 | 25.1 | 2.7 | 6.43 | 0.27 | 45.1 | 0.5 |
| March 1 | 50.87 | 0.22 | 60.2 | 0.0 | 43.00 | 0.39 | 27.8 | 2.9 | 6.70 | 0.24 | 44.6 | 0.0 |
| 11 | 51.09 | 0.20 | 60.2 | 0.4 | 43.39 | 0.34 | 30.7 | 3.0 | 6.94 | 0.20 | 44.6 | 0.3 |
| 21 | 51.29 | 0.15 | 60.6 | 0.8 | 43.73 | 0.26 | 33.7 | 3.1 | 7.14 | 0.18 | 44.9 | 0.7 |
| 31 | 51.44 | 0.12 | 61.4 | 1.0 | 43.99 | 0.21 | 36.8 | 3.1 | 7.32 | 0.14 | 45.6 | 1.0 |
| April 10 | 51.56 | 0.08 | 62.4 | 1.2 | 44.20 | 0.16 | 39.9 | 3.1 | 7.46 | 0.10 | 46.6 | 1.3 |
| 20 | 51.64 | 0.05 | 63.6 | 1.4 | 44.36 | 0.08 | 43.0 | 3.0 | 7.56 | 0.06 | 47.9 | 1.5 |
| 30 | 51.69 | 0.02 | 65.0 | 1.5 | 44.44 | 0.04 | 46.0 | 2.8 | 7.62 | 0.04 | 49.4 | 1.5 |
| May 10 | 51.71 | 0.00 | 66.5 | 1.6 | 44.48 | 0.03 | 48.8 | 2.5 | 7.66 | 0.02 | 50.9 | 1.6 |
| 20 | 51.71 | 0.04 | 68.1 | 1.5 | 44.45 | 0.08 | 51.3 | 2.3 | 7.68 | 0.03 | 52.5 | 1.6 |
| 30 | 51.67 | 0.05 | 69.6 | 1.4 | 44.37 | 0.13 | 53.6 | 2.0 | 7.65 | 0.05 | 54.1 | 1.5 |
| June 9 | 51.62 | 0.08 | 71.0 | 1.2 | 44.24 | 0.17 | 55.6 | 1.6 | 7.60 | 0.06 | 55.6 | 1.3 |
| 19 | 51.54 | 0.09 | 72.2 | 1.0 | 44.07 | 0.21 | 57.2 | 1.2 | 7.54 | 0.09 | 56.9 | 1.1 |
| 29 | 51.45 | 0.11 | 73.2 | 0.8 | 43.86 | 0.25 | 58.4 | 0.8 | 7.45 | 0.11 | 58.0 | 0.9 |
| July 9 | 51.34 | 0.12 | 74.0 | 0.6 | 43.61 | 0.30 | 59.2 | 0.3 | 7.34 | 0.12 | 58.9 | 0.6 |
| 19 | 51.22 | 0.13 | 74.6 | 0.3 | 43.31 | 0.31 | 59.5 | 0.2 | 7.22 | 0.13 | 59.5 | 0.4 |
| 29 | 51.09 | 0.12 | 74.9 | 0.0 | 43.00 | 0.32 | 59.3 | 0.6 | 7.09 | 0.14 | 59.9 | 0.1 |
| Aug. 8 | 50.97 | 0.12 | 74.9 | 0.3 | 42.68 | 0.29 | 58.7 | 1.1 | 6.95 | 0.14 | 59.8 | 0.2 |
| 18 | 50.85 | 0.12 | 74.6 | 0.6 | 42.39 | 0.28 | 57.6 | 1.6 | 6.81 | 0.14 | 59.6 | 0.5 |
| 28 | 50.73 | 0.10 | 74.0 | 0.9 | 42.11 | 0.26 | 56.0 | 1.8 | 6.67 | 0.12 | 59.1 | 0.8 |
| Sept. 7 | 50.63 | 0.08 | 73.1 | 1.1 | 41.85 | 0.19 | 54.2 | 2.0 | 6.55 | 0.10 | 58.3 | 1.2 |
| 17 | 50.55 | 0.07 | 72.0 | 1.4 | 41.66 | 0.15 | 52.2 | 2.2 | 6.45 | 0.09 | 57.1 | 1.5 |
| 27 | 50.48 | 0.01 | 70.6 | 1.8 | 41.51 | 0.07 | 50.0 | 2.5 | 6.36 | 0.03 | 55.6 | 1.7 |
| Oct. 7 | 50.47 | 0.01 | 68.8 | 2.0 | 41.44 | 0.02 | 47.5 | 2.4 | 6.33 | 0.00 | 53.9 | 2.0 |
| 17 | 50.48 | 0.08 | 66.8 | 2.2 | 41.46 | 0.11 | 45.1 | 2.2 | 6.33 | 0.04 | 51.9 | 2.3 |
| 27 | 50.56 | 0.12 | 64.6 | 2.4 | 41.57 | 0.20 | 42.9 | 2.0 | 6.37 | 0.10 | 49.6 | 2.5 |
| Nov. 6 | 50.68 | 0.17 | 62.2 | 2.5 | 41.77 | 0.29 | 40.9 | 1.7 | 6.47 | 0.15 | 47.1 | 2.6 |
| 16 | 50.85 | 0.22 | 59.7 | 2.7 | 42.06 | 0.37 | 39.2 | 1.3 | 6.62 | 0.19 | 44.5 | 2.7 |
| 26 | 51.07 | 0.26 | 57.0 | 2.8 | 42.43 | 0.45 | 37.9 | 0.9 | 6.81 | 0.23 | 41.8 | 2.8 |
| Dec. 6 | 51.33 | 0.30 | 54.2 | 2.6 | 42.88 | 0.51 | 37.0 | 0.4 | 7.04 | 0.28 | 39.0 | 2.7 |
| 16 | 51.63 | 0.32 | 51.6 | 2.4 | 43.39 | 0.55 | 36.6 | 0.0 | 7.32 | 0.32 | 36.3 | 2.6 |
| 26 | 51.95 | 0.34 | 49.2 | 2.3 | 43.94 | 0.58 | 36.6 | 0.6 | 7.64 | 0.33 | 33.7 | 2.5 |
| 36 | 52.29 | | 46.9 | | 44.52 | | 37.2 | | 7.97 | | 31.2 | |

**Note.** — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α² Centauri. | | | | ε Bootis. | | | | α² Libræ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | |
| | h. 14 | m. 29 | ° 60 | ' 13 | h. 14 | m. 38 | ° 27 | ' 40 | h. 14 | m. 42 | ° 15 | ' 26 |
| | s. | s. | " | " | s. | s. | " | " | s. | s. | " | " |
| Jan. 1 | 49.21 | 0.58 | 55.5 | 0.3 | 40.85 | 0.34 | 48.6 | 2.5 | 53.74 | 0.34 | 25.6 | 1.6 |
| 11 | 49.79 | 0.58 | 55.8 | 0.8 | 41.19 | 0.35 | 46.1 | 2.1 | 54.08 | 0.36 | 27.2 | 1.7 |
| 21 | 50.37 | 0.57 | 56.6 | 1.2 | 41.54 | 0.36 | 44.0 | 1.7 | 54.44 | 0.35 | 28.9 | 1.7 |
| 31 | 50.94 | 0.56 | 57.8 | 1.6 | 41.90 | 0.34 | 42.3 | 1.4 | 54.79 | 0.32 | 30.6 | 1.6 |
| Feb. 10 | 51.50 | 0.53 | 59.4 | 1.9 | 42.24 | 0.32 | 40.9 | 0.8 | 55.11 | 0.31 | 32.2 | 1.6 |
| 20 | 52.03 | 0.50 | 61.3 | 2.2 | 42.56 | 0.30 | 40.1 | 0.3 | 55.42 | 0.30 | 33.8 | 1.5 |
| March 1 | 52.53 | 0.45 | 63.5 | 2.5 | 42.86 | 0.29 | 39.8 | 0.2 | 55.72 | 0.27 | 35.3 | 1.3 |
| 11 | 52.98 | 0.38 | 66.0 | 2.7 | 43.15 | 0.24 | 40.0 | 0.6 | 55.99 | 0.24 | 36.6 | 1.2 |
| 21 | 53.36 | 0.34 | 68.7 | 2.8 | 43.39 | 0.20 | 40.6 | 1.1 | 56.23 | 0.21 | 37.8 | 1.0 |
| 31 | 53.70 | 0.27 | 71.5 | 2.9 | 43.59 | 0.18 | 41.7 | 1.4 | 56.44 | 0.19 | 38.8 | 0.8 |
| April 10 | 53.97 | 0.22 | 74.4 | 2.9 | 43.77 | 0.13 | 43.1 | 1.7 | 56.63 | 0.16 | 39.6 | 0.6 |
| 20 | 54.19 | 0.16 | 77.3 | 2.9 | 43.90 | 0.09 | 44.8 | 1.9 | 56.79 | 0.12 | 40.2 | 0.5 |
| 30 | 54.35 | 0.10 | 80.2 | 2.7 | 43.99 | 0.06 | 46.7 | 2.1 | 56.91 | 0.09 | 40.7 | 0.3 |
| May 10 | 54.45 | 0.03 | 82.9 | 2.6 | 44.05 | 0.03 | 48.8 | 2.1 | 57.00 | 0.06 | 41.0 | 0.2 |
| 20 | 54.48 | 0.03 | 85.5 | 2.5 | 44.08 | 0.00 | 50.9 | 2.0 | 57.06 | 0.04 | 41.2 | 0.1 |
| 30 | 54.45. | 0.08 | 88.0 | 2.3 | 44.08 | 0.03 | 52.9 | 2.0 | 57.10 | 0.01 | 41.3 | 0.0 |
| June 9 | 54.37 | 0.13 | 90.3 | 1.9 | 44.05 | 0.06 | 54.9 | 1.7 | 57.11 | 0.02 | 41.3 | 0.1 |
| 19 | 54.24 | 0.20 | 92.2 | 1.5 | 43.99 | 0.09 | 56.6 | 1.5 | 57.09 | 0.05 | 41.2 | 0.2 |
| 29 | 54.04 | 0.24 | 93.7 | 1.1 | 43.90 | 0.12 | 58.1 | 1.2 | 57.04 | 0.07 | 41.0 | 0.3 |
| July 9 | 53.80 | 0.28 | 94.8 | 0.6 | 43.78 | 0.13 | 59.3 | 0.7 | 56.97 | 0.09 | 40.7 | 0.3 |
| 19 | 53.52 | 0.31 | 95.4 | 0.4 | 43.65 | 0.15 | 60.0 | 0.8 | 56.88 | 0.11 | 40.4 | 0.4 |
| 29 | 53.21 | 0.33 | 95.8 | 0.4 | 43.50 | 0.15 | 60.8 | 0.2 | 56.77 | 0.14 | 40.0 | 0.4 |
| Aug. 8 | 52.88 | 0.34 | 95.4 | 0.8 | 43.35 | 0.17 | 61.0 | 0.2 | 56.63 | 0.14 | 39.6 | 0.5 |
| 18 | 52.54 | 0.33 | 94.6 | 1.1 | 43.18 | 0.16 | 60.8 | 0.5 | 56.49 | 0.13 | 39.1 | 0.5 |
| 28 | 52.21 | 0.31 | 93.5 | 1.5 | 43.02 | 0.16 | 60.3 | 1.0 | 56.36 | 0.13 | 38.6 | 0.5 |
| Sept. 7 | 51.90 | 0.26 | 92.0 | 1.8 | 42.86 | 0.14 | 59.3 | 1.2 | 56.23 | 0.11 | 38.1 | 0.5 |
| 17 | 51.64 | 0.21 | 90.2 | 2.1 | 42.72 | 0.12 | 58.1 | 1.6 | 56.12 | 0.09 | 37.6 | 0.4 |
| 27 | 51.43 | 0.14 | 88.1 | 2.3 | 42.60 | 0.08 | 56.5 | 2.0 | 56.03 | 0.06 | 37.2 | 0.2 |
| Oct. 7 | 51.29 | 0.05 | 85.8 | 2.3 | 42.52 | 0.03 | 54.5 | 2.3 | 55.97 | 0.01 | 37.0 | 0.0 |
| 17 | 51.24 | 0.02 | 83.5 | 2.3 | 42.49 | 0.01 | 52.2 | 2.5 | 55.96 | 0.03 | 37.0 | 0.1 |
| 27 | 51.26 | 0.13 | 81.2 | 2.1 | 42.50 | 0.06 | 49.7 | 2.7 | 55.99 | 0.07 | 37.1 | 0.3 |
| Nov. 6 | 51.39 | 0.21 | 79.1 | 1.9 | 42.56 | 0.11 | 47.0 | 2.9 | 56.06 | 0.14 | 37.4 | 0.5 |
| 16 | 51.60 | 0.31 | 77.2 | 1.7 | 42.67 | 0.16 | 44.1 | 2.9 | 56.20 | 0.18 | 37.9 | 0.7 |
| 26 | 51.91 | 0.39 | 75.5 | 1.3 | 42.83 | 0.21 | 41.2 | 3.0 | 56.38 | 0.23 | 38.6 | 1.0 |
| Dec. 6 | 52.30 | 0.46 | 74.2 | 0.9 | 43.04 | 0.26 | 38.2 | 2.9 | 56.61 | 0.28 | 39.6 | 1.2 |
| 16 | 52.76 | 0.51 | 73.3 | 0.4 | 43.30 | 0.30 | 35.3 | 2.9 | 56.89 | 0.31 | 40.8 | 1.4 |
| 26 | 53.27 | 0.57 | 72.9 | 0.1 | 43.60 | 0.33 | 32.4 | 2.7 | 57.20 | 0.33 | 42.2 | 1.5 |
| 36 | 53.84 | | 73.0 | | 43.93 | | 29.7 | | 57.53 | | 43.7 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Ursæ Minoris. | | | | β Libræ. | | | | α Coronæ Borealis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North*. | | Right Ascension. | | Dec. *South*. | | Right Ascension. | | Dec. *North*. | |
| | h. 14 | m. 51 | ° 74 | ′ 44 | h. 15 | m. 9 | ° 8 | ′ 50 | h. 15 | m. 28 | ° 27 | ′ 11 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 8.92 | 0.78 | 18.2 | 2.4 | 14.32 | 0.32 | 56.9 | 1.7 | 34.20 | 0.31 | 54.6 | 2.6 |
| 11 | 9.70 | 0.85 | 15.8 | 1.9 | 14.64 | 0.33 | 58.6 | 1.7 | 34.51 | 0.32 | 52.0 | 2.3 |
| 21 | 10.55 | 0.89 | 13.9 | 1.3 | 14.97 | 0.34 | 60.3 | 1.7 | 34.83 | 0.34 | 49.7 | 2.0 |
| 31 | 11.44 | 0.90 | 12.6 | 0.5 | 15.31 | 0.33 | 62.0 | 1.6 | 35.17 | 0.34 | 47.7 | 1.6 |
| Feb. 10 | 12.34 | 0.88 | 12.1 | 0.2 | 15.64 | 0.33 | 63.6 | 1.4 | 35.51 | 0.34 | 46.1 | 1.1 |
| 20 | 13.22 | 0.84 | 12.3 | 0.9 | 15.97 | 0.30 | 65.0 | 1.2 | 35.85 | 0.32 | 45.0 | 0.6 |
| March 1 | 14.06 | 0.75 | 13.2 | 1.4 | 16.27 | 0.27 | 66.2 | 1.1 | 36.17 | 0.30 | 44.4 | 0.0 |
| 11 | 14.81 | 0.66 | 14.6 | 2.1 | 16.54 | 0.25 | 67.3 | 0.9 | 36.47 | 0.28 | 44.4 | 0.4 |
| 21 | 15.47 | 0.53 | 16.7 | 2.3 | 16.79 | 0.23 | 68.2 | 0.6 | 36.75 | 0.24 | 44.8 | 0.9 |
| 31 | 16.00 | 0.40 | 19.0 | 2.7 | 17.02 | 0.20 | 68.8 | 0.3 | 36.99 | 0.22 | 45.7 | 1.2 |
| April 10 | 16.40 | 0.26 | 21.7 | 3.0 | 17.22 | 0.18 | 69.1 | 0.1 | 37.21 | 0.19 | 46.9 | 1.6 |
| 20 | 16.66 | 0.12 | 24.7 | 3.2 | 17.40 | 0.14 | 69.2 | 0.0 | 37.40 | 0.14 | 48.5 | 1.9 |
| 30 | 16.78 | 0.03 | 27.9 | 3.1 | 17.54 | 0.11 | 69.2 | 0.1 | 37.54 | 0.11 | 50.4 | 2.1 |
| May 10 | 16.75 | 0.16 | 31.0 | 2.9 | 17.65 | 0.09 | 69.1 | 0.3 | 37.65 | 0.08 | 52.5 | 2.3 |
| 20 | 16.59 | 0.31 | 33.9 | 2.7 | 17.74 | 0.06 | 68.8 | 0.3 | 37.73 | 0.04 | 54.8 | 2.2 |
| 30 | 16.28 | 0.40 | 36.6 | 2.6 | 17.80 | 0.03 | 68.5 | 0.4 | 37.77 | 0.02 | 57.0 | 2.2 |
| June 9 | 15.88 | 0.51 | 39.2 | 2.1 | 17.83 | 0.00 | 68.1 | 0.5 | 37.79 | 0.02 | 59.2 | 2.0 |
| 19 | 15.37 | 0.60 | 41.3 | 1.6 | 17.83 | 0.03 | 67.6 | 0.5 | 37.77 | 0.06 | 61.2 | 1.9 |
| 29 | 14.77 | 0.69 | 42.9 | 1.2 | 17.80 | 0.06 | 67.1 | 0.5 | 37.71 | 0.09 | 63.1 | 1.6 |
| July 9 | 14.08 | 0.73 | 44.1 | 0.7 | 17.74 | 0.08 | 66.6 | 0.4 | 37.62 | 0.11 | 64.7 | 1.3 |
| 19 | 13.35 | 0.78 | 44.8 | 0.2 | 17.66 | 0.11 | 66.2 | 0.4 | 37.51 | 0.13 | 66.0 | 0.9 |
| 29 | 12.57 | 0.80 | 45.0 | 0.5 | 17.55 | 0.12 | 65.8 | 0.4 | 37.38 | 0.17 | 66.9 | 0.6 |
| Aug. 8 | 11.77 | 0.79 | 44.5 | 0.9 | 17.43 | 0.14 | 65.4 | 0.4 | 37.21 | 0.18 | 67.5 | 0.0 |
| 18 | 10.98 | 0.78 | 43.6 | 1.5 | 17.29 | 0.14 | 65.0 | 0.4 | 37.03 | 0.18 | 67.5 | 0.0 |
| 28 | 10.20 | 0.74 | 42.1 | 2.0 | 17.15 | 0.14 | 64.6 | 0.3 | 36.85 | 0.18 | 67.5 | 0.5 |
| Sept. 7 | 9.46 | 0.68 | 40.1 | 2.3 | 17.01 | 0.13 | 64.3 | 0.1 | 36.67 | 0.17 | 67.0 | 0.9 |
| 17 | 8.78 | 0.63 | 37.8 | 2.9 | 16.88 | 0.11 | 64.2 | 0.1 | 36.50 | 0.15 | 66.1 | 1.3 |
| 27 | 8.15 | 0.52 | 34.9 | 3.2 | 16.77 | 0.07 | 64.1 | 0.1 | 36.35 | 0.13 | 64.8 | 1.7 |
| Oct. 7 | 7.63 | 0.40 | 31.7 | 3.5 | 16.70 | 0.03 | 64.2 | 0.2 | 36.22 | 0.09 | 63.1 | 2.0 |
| 17 | 7.23 | 0.28 | 28.2 | 3.7 | 16.67 | 0.01 | 64.4 | 0.5 | 36.13 | 0.05 | 61.1 | 2.2 |
| 27 | 6.95 | 0.13 | 24.5 | 3.8 | 16.66 | 0.05 | 64.9 | 0.7 | 36.08 | 0.00 | 58.9 | 2.5 |
| Nov. 6 | 6.82 | 0.01 | 20.7 | 3.8 | 16.71 | 0.11 | 65.6 | 0.9 | 36.08 | 0.05 | 56.4 | 2.3 |
| 16 | 6.83 | 0.17 | 16.9 | 3.8 | 16.82 | 0.15 | 66.5 | 1.1 | 36.13 | 0.10 | 53.6 | 2.9 |
| 26 | 7.00 | 0.31 | 13.1 | 3.7 | 16.97 | 0.20 | 67.6 | 1.2 | 36.23 | 0.16 | 50.7 | 2.9 |
| Dec. 6 | 7.31 | 0.47 | 9.4 | 3.5 | 17.17 | 0.25 | 68.8 | 1.4 | 36.39 | 0.21 | 47.8 | 3.0 |
| 16 | 7.78 | 0.60 | 5.9 | 3.1 | 17.42 | 0.28 | 70.2 | 1.6 | 36.60 | 0.26 | 44.8 | 2.9 |
| 26 | 8.38 | 0.73 | 2.8 | 2.7 | 17.70 | 0.30 | 71.8 | 1.6 | 36.86 | 0.29 | 41.9 | 2.8 |
| 36 | 9.11 | | 0.1 | | 18.00 | | 73.4 | | 37.15 | | 39.1 | |

Note. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon ;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Serpentis. | | | | ζ Ursæ Minoris. | | | | β¹ Scorpii. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North*. | | Right Ascension. | | Dec. *North*. | | Right Ascension. | | Dec. *South*. | |
| | h. 15 | m. 37 | ° 6 | ′ 52 | h. 15 | m. 49 | ° 78 | ′ 13 | h. 15 | m. 57 | ° 19 | ′ 24 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 9.21 | 0.30 | 47.0 | 2.1 | 14.45 | 0.77 | 48.9 | 2.9 | 2.40 | 0.31 | 28.8 | 1.1 |
| 11 | 9.51 | 0.31 | 44.9 | 2.1 | 15.22 | 0.93 | 46.0 | 2.4 | 2.71 | 0.34 | 29.9 | 1.1 |
| 21 | 9.82 | 0.32 | 42.8 | 1.9 | 16.15 | 1.00 | 43.6 | 1.9 | 3.05 | 0.34 | 31.0 | 1.2 |
| 31 | 10.14 | 0.32 | 40.9 | 1.5 | 17.15 | 1.08 | 41.7 | 1.3 | 3.39 | 0.33 | 32.2 | 1.2 |
| Feb. 10 | 10.46 | 0.31 | 39.4 | 1.2 | | | | | | | | |
| | | | | | 18.23 | 1.11 | 40.4 | 0.6 | 3.72 | 0.34 | 33.4 | 1.2 |
| 20 | 10.77 | 0.31 | 38.2 | 0.9 | 19.34 | 1.11 | 39.8 | 0.1 | 4.06 | 0.33 | 34.6 | 1.1 |
| March 1 | 11.08 | 0.29 | 37.3 | 0.6 | 20.45 | 1.05 | 39.9 | 0.8 | 4.39 | 0.32 | 35.7 | 1.0 |
| 11 | 11.37 | 0.27 | 36.7 | 0.3 | 21.50 | 0.96 | 40.7 | 1.5 | 4.71 | 0.31 | 36.7 | 1.0 |
| 21 | 11.64 | 0.24 | 36.4 | 0.1 | 22.46 | 0.86 | 42.2 | 1.9 | 5.02 | 0.27 | 37.7 | 0.8 |
| 31 | 11.88 | 0.21 | 36.5 | 0.4 | 23.32 | 0.71 | 44.1 | 2.4 | 5.29 | 0.24 | 38.5 | 0.7 |
| April 10 | 12.09 | 0.19 | 36.9 | 0.7 | 24.03 | 0.55 | 46.5 | 2.8 | 5.53 | 0.23 | 39.2 | 0.6 |
| 20 | 12.28 | 0.16 | 37.6 | 1.0 | 24.58 | 0.37 | 49.3 | 3.1 | 5.76 | 0.20 | 39.8 | 0.4 |
| 30 | 12.44 | 0.13 | 38.6 | 1.2 | 24.95 | 0.18 | 52.4 | 3.1 | 5.96 | 0.18 | 40.2 | 0.3 |
| May 10 | 12.57 | 0.10 | 39.8 | 1.3 | 25.13 | 0.00 | 55.5 | 3.1 | 6.14 | 0.14 | 40.5 | 0.2 |
| 20 | 12.67 | 0.07 | 41.1 | 1.3 | 25.13 | 0.19 | 58.6 | 3.0 | 6.28 | 0.13 | 40.7 | 0.2 |
| 30 | 12.74 | 0.04 | 42.4 | 1.2 | 24.94 | 0.35 | 61.6 | 2.9 | 6.39 | 0.07 | 40.9 | 0.1 |
| June 9 | 12.78 | 0.01 | 43.6 | 1.3 | 24.59 | 0.52 | 64.5 | 2.6 | 6.46 | 0.04 | 41.0 | 0.1 |
| 19 | 12.79 | 0.02 | 44.9 | 1.2 | 24.07 | 0.66 | 67.1 | 2.2 | 6.50 | 0.01 | 41.1 | 0.0 |
| 29 | 12.77 | 0.05 | 46.1 | 1.1 | 23.41 | 0.80 | 69.3 | 1.9 | 6.51 | 0.03 | 41.1 | 0.1 |
| July 9 | 12.72 | 0.07 | 47.2 | 0.9 | 22.61 | 0.91 | 71.2 | 1.4 | 6.48 | 0.06 | 41.0 | 0.1 |
| 19 | 12.65 | 0.10 | 48.1 | 0.7 | 21.70 | 1.01 | 72.6 | 1.0 | 6.42 | 0.09 | 40.9 | 0.1 |
| 29 | 12.55 | 0.13 | 48.8 | 0.6 | 20.69 | 1.06 | 73.6 | 0.4 | 6.33 | 0.11 | 40.8 | 0.2 |
| Aug. 8 | 12.42 | 0.15 | 49.4 | 0.4 | 19.63 | 1.10 | 74.0 | 0.1 | 6.22 | 0.14 | 40.6 | 0.2 |
| 18 | 12.27 | 0.15 | 49.8 | 0.1 | 18.53 | 1.13 | 73.9 | 0.6 | 6.08 | 0.15 | 40.4 | 0.3 |
| 28 | 12.12 | 0.15 | 49.9 | 0.1 | 17.40 | 1.12 | 73.3 | 1.1 | 5.93 | 0.17 | 40.1 | 0.4 |
| Sept. 7 | 11.97 | 0.14 | 49.8 | 0.3 | 16.28 | 1.08 | 72.2 | 1.8 | 5.76 | 0.15 | 39.7 | 0.5 |
| 17 | 11.83 | 0.13 | 49.5 | 0.5 | 15.20 | 1.01 | 70.4 | 2.1 | 5.61 | 0.14 | 39.2 | 0.3 |
| 27 | 11.70 | 0.11 | 49.0 | 0.8 | 14.19 | 0.92 | 68.3 | 2.5 | 5.47 | 0.12 | 38.9 | 0.2 |
| Oct. 7 | 11.59 | 0.07 | 48.2 | 1.0 | 13.27 | 0.82 | 65.8 | 2.9 | 5.35 | 0.08 | 38.7 | 0.2 |
| 17 | 11.52 | 0.03 | 47.2 | 1.3 | 12.45 | 0.66 | 62.9 | 3.3 | 5.27 | 0.03 | 38.5 | 0.2 |
| 27 | 11.49 | 0.01 | 45.9 | 1.5 | 11.79 | 0.51 | 59.6 | 3.5 | 5.24 | 0.02 | 38.3 | 0.1 |
| Nov. 6 | 11.50 | 0.07 | 44.4 | 1.7 | 11.28 | 0.31 | 56.1 | 3.6 | 5.26 | 0.06 | 38.2 | 0.1 |
| 16 | 11.57 | 0.12 | 42.7 | 1.9 | 10.97 | 0.12 | 52.5 | 3.7 | 5.32 | 0.10 | 38.3 | 0.3 |
| 26 | 11.69 | 0.16 | 40.8 | 2.0 | 10.85 | 0.08 | 48.8 | 3.8 | 5.42 | 0.16 | 38.6 | 0.5 |
| Dec. 6 | 11.85 | 0.20 | 38.8 | 2.1 | 10.93 | 0.28 | 45.0 | 3.6 | 5.58 | 0.21 | 39.1 | 0.6 |
| 16 | 12.05 | 0.25 | 36.7 | 2.2 | 11.21 | 0.49 | 41.4 | 3.4 | 5.79 | 0.26 | 39.7 | 0.8 |
| 26 | 12.30 | 0.27 | 34.5 | 2.1 | 11.70 | 0.65 | 38.0 | 3.1 | 6.05 | 0.31 | 40.5 | 1.0 |
| 36 | 12.57 | | 32.4 | | 12.35 | | 34.9 | | 6.36 | | 41.5 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | δ Ophiuchi. | | | | α Scorpii. (*Antares.*) | | | | η Draconis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | |
| | h. 16 | m. 6 | ° 3 | ′ 19 | h. 16 | m. 20 | ° 26 | ′ 6 | h. 16 | m. 22 | ° 61 | ′ 49 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 46.51 | 0.28 | 17.9 | 1.8 | 33.11 | 0.30 | 31.1 | 0.6 | 1.14 | 0.36 | 71.8 | 3.2 |
| 11 | 46.79 | 0.31 | 19.7 | 1.7 | 33.41 | 0.33 | 31.7 | 0.7 | 1.50 | 0.41 | 68.6 | 2.8 |
| 21 | 47.10 | 0.31 | 21.4 | 1.6 | 33.74 | 0.36 | 32.4 | 0.9 | 1.91 | 0.47 | 65.8 | 2.4 |
| 31 | 47.41 | 0.32 | 23.0 | 1.3 | 34.10 | 0.35 | 33.3 | 0.9 | 2.38 | 0.50 | 63.4 | 1.9 |
| Feb. 10 | 47.73 | 0.32 | 24.3 | 1.2 | 34.45 | 0.36 | 34.2 | 0.9 | 2.88 | 0.52 | 61.5 | 1.3 |
| 20 | 48.05 | 0.31 | 25.5 | 1.1 | 34.81 | 0.35 | 35.1 | 0.9 | 3.40 | 0.53 | 60.2 | 0.6 |
| March 1 | 48.36 | 0.30 | 26.6 | 0.8 | 35.16 | 0.34 | 36.0 | 1.0 | 3.93 | 0.52 | 59.6 | 0.1 |
| 11 | 48.66 | 0.28 | 27.4 | 0.4 | 35.50 | 0.32 | 37.0 | 0.9 | 4.45 | 0.49 | 59.7 | 0.7 |
| 21 | 48.94 | 0.27 | 27.8 | 0.1 | 35.82 | 0.31 | 37.9 | 0.8 | 4.94 | 0.44 | 60.4 | 1.3 |
| 31 | 49.21 | 0.24 | 27.9 | 0.0 | 36.13 | 0.28 | 38.7 | 0.8 | 5.38 | 0.39 | 61.7 | 1.9 |
| April 10 | 49.45 | 0.22 | 27.9 | 0.2 | 36.41 | 0.26 | 39.5 | 0.7 | 5.77 | 0.35 | 63.6 | 2.4 |
| 20 | 49.67 | 0.19 | 27.7 | 0.4 | 36.67 | 0.24 | 40.2 | 0.7 | 6.12 | 0.27 | 66.0 | 2.8 |
| 30 | 49.86 | 0.17 | 27.3 | 0.6 | 36.91 | 0.20 | 40.9 | 0.6 | 6.39 | 0.19 | 68.8 | 3.0 |
| May 10 | 50.03 | 0.13 | 26.7 | 0.7 | 37.11 | 0.17 | 41.5 | 0.5 | 6.58 | 0.13 | 71.8 | 3.3 |
| 20 | 50.16 | 0.11 | 26.0 | 0.8 | 37.28 | 0.14 | 42.0 | 0.5 | 6.71 | 0.05 | 75.1 | 3.3 |
| 30 | 50.27 | 0.07 | 25.2 | 0.9 | 37.42 | 0.10 | 42.5 | 0.5 | 6.76 | 0.02 | 78.4 | 3.1 |
| June 9 | 50.34 | 0.05 | 24.3 | 0.9 | 37.52 | 0.07 | 43.0 | 0.4 | 6.74 | 0.10 | 81.5 | 3.1 |
| 19 | 50.39 | 0.01 | 23.4 | 0.8 | 37.59 | 0.03 | 43.4 | 0.4 | 6.64 | 0.18 | 84.6 | 2.8 |
| 29 | 50.40 | 0.03 | 22.6 | 0.8 | 37.62 | 0.01 | 43.8 | 0.3 | 6.46 | 0.23 | 87.4 | 2.5 |
| July 9 | 50.37 | 0.05 | 21.8 | 0.7 | 37.61 | 0.04 | 44.1 | 0.2 | 6.23 | 0.30 | 89.9 | 2.1 |
| 19 | 50.32 | 0.09 | 21.1 | 0.6 | 37.57 | 0.09 | 44.3 | 0.2 | 5.93 | 0.35 | 92.0 | 1.6 |
| 29 | 50.23 | 0.11 | 20.5 | 0.5 | 37.48 | 0.11 | 44.5 | 0.0 | 5.58 | 0.38 | 93.6 | 1.2 |
| Aug. 8 | 50.12 | 0.13 | 20.0 | 0.4 | 37.37 | 0.14 | 44.5 | 0.0 | 5.20 | 0.42 | 94.8 | 0.5 |
| 18 | 49.99 | 0.15 | 19.6 | 0.2 | 37.23 | 0.17 | 44.5 | 0.2 | 4.78 | 0.45 | 95.3 | 0.0 |
| 28 | 49.84 | 0.16 | 19.4 | 0.1 | 37.06 | 0.17 | 44.3 | 0.3 | 4.33 | 0.45 | 95.3 | 0.5 |
| Sept. 7 | 49.68 | 0.15 | 19.3 | 0.1 | 36.89 | 0.17 | 44.0 | 0.4 | 3.88 | 0.45 | 94.8 | 1.0 |
| 17 | 49.53 | 0.13 | 19.2 | 0.2 | 36.72 | 0.15 | 43.6 | 0.4 | 3.43 | 0.44 | 93.8 | 1.5 |
| 27 | 49.40 | 0.12 | 19.4 | 0.3 | 36.57 | 0.14 | 43.2 | 0.5 | 2.99 | 0.40 | 92.3 | 2.0 |
| Oct. 7 | 49.28 | 0.09 | 19.7 | 0.5 | 36.43 | 0.11 | 42.7 | 0.5 | 2.59 | 0.35 | 90.3 | 2.4 |
| 17 | 49.19 | 0.06 | 20.2 | 0.6 | 36.32 | 0.06 | 42.2 | 0.5 | 2.24 | 0.29 | 87.9 | 2.7 |
| 27 | 49.13 | 0.01 | 20.8 | 0.8 | 36.26 | 0.01 | 41.7 | 0.4 | 1.95 | 0.23 | 85.2 | 3.1 |
| Nov. 6 | 49.14 | 0.04 | 21.6 | 1.1 | 36.25 | 0.04 | 41.3 | 0.3 | 1.72 | 0.13 | 82.1 | 3.5 |
| 16 | 49.18 | 0.09 | 22.7 | 1.2 | 36.29 | 0.09 | 41.0 | 0.2 | 1.59 | 0.05 | 78.6 | 3.7 |
| 26 | 49.27 | 0.14 | 23.9 | 1.4 | 36.38 | 0.16 | 40.8 | 0.1 | 1.54 | 0.03 | 74.9 | 3.7 |
| Dec. 6 | 49.41 | 0.19 | 25.3 | 1.6 | 36.54 | 0.20 | 40.7 | 0.2 | 1.57 | 0.13 | 71.2 | 3.7 |
| 16 | 49.60 | 0.23 | 26.9 | 1.6 | 36.74 | 0.25 | 40.9 | 0.3 | 1.70 | 0.23 | 67.5 | 3.6 |
| 26 | 49.83 | 0.26 | 28.5 | 1.7 | 36.99 | 0.29 | 41.2 | 0.5 | 1.93 | 0.30 | 63.9 | 3.5 |
| 36 | 50.09 | | 30.2 | | 37.28 | | 41.7 | | 2.23 | | 60.4 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon ;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Trianguli Australis. | | | | ε Ursæ Minoris. | | | | α Herculis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h 16 | m. 33 | ° 68 | ′ 45 | h. 17 | m. 0 | ° 82 | ′ 15 | h. 17 | m. 8 | ° 14 | ′ 33 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 23.03 | 0.62 | 16.7 | 1.4 | 44.62 | 0.63 | 46.6 | 3.2 | 3.20 | 0.22 | 18.2 | 2.4 |
| 11 | 23.65 | 0.70 | 15.3 | 1.2 | 45.25 | 0.91 | 43.4 | 3.0 | 3.42 | 0.26 | 15.8 | 2.2 |
| 21 | 24.35 | 0.75 | 14.1 | 0.8 | 46.16 | 1.17 | 40.4 | 2.6 | 3.68 | 0.27 | 13.6 | 1.9 |
| 31 | 25.10 | 0.77 | 13.3 | 0.3 | 47.33 | 1.36 | 37.8 | 2.0 | 3.95 | 0.30 | 11.7 | 1.8 |
| Feb. 10 | 25.87 | 0.80 | 13.0 | 0.0 | 48.69 | 1.49 | 35.8 | 1.5 | 4.25 | 0.30 | 9.9 | 1.4 |
| 20 | 26.67 | 0.79 | 13.0 | 0.5 | 50.18 | 1.59 | 34.3 | 0.9 | 4.55 | 0.31 | 8.5 | 0.9 |
| March 1 | 27.46 | 0.77 | 13.5 | 0.9 | 51.77 | 1.61 | 33.4 | 0.1 | 4.86 | 0.30 | 7.6 | 0.5 |
| 11 | 28.23 | 0.74 | 14.4 | 1.2 | 53.38 | 1.58 | 33.3 | 0.2 | 5.16 | 0.31 | 7.1 | 0.1 |
| 21 | 28.97 | 0.71 | 15.6 | 1.5 | 54.96 | 1.48 | 33.5 | 1.0 | 5.47 | 0.29 | 7.0 | 0.2 |
| 31 | 29.68 | 0.68 | 17.1 | 1.8 | 56.44 | 1.34 | 34.5 | 1.5 | 5.76 | 0.28 | 7.2 | 0.7 |
| April 10 | 30.36 | 0.61 | 18.9 | 2.1 | 57.78 | 1.15 | 36.0 | 2.1 | 6.04 | 0.25 | 7.9 | 1.0 |
| 20 | 30.97 | 0.52 | 21.0 | 2.4 | 58.93 | 0.94 | 38.1 | 2.6 | 6.29 | 0.23 | 8.9 | 1.4 |
| 30 | 31.49 | 0.46 | 23.4 | 2.6 | 59.87 | 0.68 | 40.7 | 2.9 | 6.52 | 0.21 | 10.3 | 1.6 |
| May 10 | 31.95 | 0.37 | 26.0 | 2.6 | 60.55 | 0.39 | 43.6 | 3.1 | 6.73 | 0.17 | 11.9 | 1.8 |
| 20 | 32.32 | 0.29 | 28.6 | 2.7 | 60.94 | 0.16 | 46.7 | 3.2 | 6.90 | 0.15 | 13.7 | 1.9 |
| 30 | 32.61 | 0.19 | 31.3 | 2.7 | 61.10 | 0.18 | 49.9 | 3.3 | 7.05 | 0.13 | 15.6 | 1.9 |
| June 9 | 32.80 | 0.10 | 34.0 | 2.7 | 60.92 | 0.44 | 53.2 | 3.1 | 7.18 | 0.07 | 17.5 | 1.9 |
| 19 | 32.90 | 0.01 | 36.7 | 2.6 | 60.48 | 0.69 | 56.3 | 2.9 | 7.25 | 0.05 | 19.4 | 1.9 |
| 29 | 32.89 | 0.10 | 39.3 | 2.4 | 59.79 | 0.96 | 59.2 | 2.7 | 7.30 | 0.00 | 21.3 | 1.7 |
| July 9 | 32.79 | 0.20 | 41.7 | 2.1 | 58.83 | 1.16 | 61.9 | 2.4 | 7.30 | 0.03 | 23.0 | 1.6 |
| 19 | 32.59 | 0.29 | 43.8 | 1.9 | 57.67 | 1.36 | 64.3 | 2.0 | 7.27 | 0.07 | 24.6 | 1.4 |
| 29 | 32.30 | 0.36 | 45.7 | 1.5 | 56.31 | 1.54 | 66.3 | 1.5 | 7.20 | 0.10 | 26.0 | 1.1 |
| Aug. 8 | 31.94 | 0.43 | 47.2 | 1.0 | 54.77 | 1.68 | 67.8 | 1.0 | 7.10 | 0.13 | 27.1 | 0.9 |
| 18 | 31.51 | 0.47 | 48.2 | 0.4 | 53.09 | 1.77 | 68.8 | 0.5 | 6.97 | 0.15 | 28.0 | 0.6 |
| 28 | 31.04 | 0.49 | 48.6 | 0.0 | 51.32 | 1.83 | 69.3 | 0.1 | 6.82 | 0.18 | 28.6 | 0.3 |
| Sept. 7 | 30.55 | 0.49 | 48.6 | 0.5 | 49.49 | 1.84 | 69.2 | 0.5 | 6.64 | 0.18 | 28.9 | 0.1 |
| 17 | 30.06 | 0.47 | 48.1 | 1.0 | 47.65 | 1.80 | 68.7 | 1.0 | 6.46 | 0.18 | 29.0 | 0.3 |
| 27 | 29.59 | 0.43 | 47.1 | 1.5 | 45.85 | 1.77 | 67.7 | 1.6 | 6.28 | 0.17 | 28.7 | 0.6 |
| Oct. 7 | 29.16 | 0.34 | 45.6 | 1.9 | 44.08 | 1.63 | 66.1 | 2.0 | 6.11 | 0.14 | 28.1 | 0.9 |
| 17 | 28.82 | 0.26 | 43.7 | 2.1 | 42.45 | 1.47 | 64.1 | 2.4 | 5.97 | 0.11 | 27.2 | 1.3 |
| 27 | 28.56 | 0.14 | 41.6 | 2.4 | 40.98 | 1.30 | 61.7 | 2.8 | 5.86 | 0.07 | 25.9 | 1.5 |
| Nov. 6 | 28.42 | 0.01 | 39.2 | 2.5 | 39.68 | 1.05 | 58.9 | 3.1 | 5.79 | 0.04 | 24.4 | 1.8 |
| 16 | 28.41 | 0.10 | 36.7 | 2.5 | 38.63 | 0.81 | 55.8 | 3.3 | 5.75 | 0.03 | 22.6 | 2.0 |
| 26 | 28.51 | 0.22 | 34.2 | 2.5 | 37.82 | 0.47 | 52.5 | 3.5 | 5.78 | 0.06 | 20.6 | 2.2 |
| Dec. 6 | 28.73 | 0.37 | 31.7 | 2.4 | 37.35 | 0.16 | 49.0 | 3.5 | 5.84 | 0.12 | 18.4 | 2.3 |
| 16 | 29.10 | 0.47 | 29.3 | 2.1 | 37.19 | 0.11 | 45.5 | 3.5 | 5.96 | 0.16 | 16.1 | 2.4 |
| 26 | 29.57 | 0.57 | 27.2 | 1.8 | 37.30 | 0.45 | 42.0 | 3.4 | 6.12 | 0.20 | 13.7 | 2.4 |
| 36 | 30.14 | | 25.4 | | 37.75 | | 38.6 | | 6.32 | | 11.3 | |

after the 22d of March it begins at the Sidereal 0h. before the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Draconis. | | | | α Ophiuchi. | | | | σ Octantis. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | | Dec. *South.* | |
| | h. 17 | m. 27 | 52° | 24′ | h. 17 | m. 28 | 12° | 39′ | | h. 17 | | 89° | 16′ |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | m. | s. | s. | ″ | ″ |
| Jan. 1 | 8.59 | 0.21 | 21.9 | 3.4 | 13.26 | 0.20 | 56.2 | 2.2 | 38 | 47.07 | 10.72 | 37.0 | 2.8 |
| 11 | 8.80 | 0.27 | 18.5 | 3.2 | 13.46 | 0.24 | 54.0 | 2.1 | 38 | 57.79 | 13.52 | 34.2 | 2.5 |
| 21 | 9.07 | 0.33 | 15.3 | 2.8 | 13.70 | 0.27 | 51.9 | 1.9 | 39 | 11.31 | 15.94 | 31.7 | 2.2 |
| 31 | 9.40 | 0.35 | 12.5 | 2.4 | 13.97 | 0.28 | 50.0 | 1.7 | 39 | 27.25 | 17.87 | 29.5 | 1.8 |
| Feb. 10 | 9.75 | 0.39 | 10.1 | 1.9 | 14.25 | 0.29 | 48.3 | 1.4 | 39 | 45.12 | 19.37 | 27.7 | 1.3 |
| 20 | 10.14 | 0.41 | 8.2 | 1.4 | 14.54 | 0.31 | 46.9 | 1.1 | 40 | 4.49 | 20.41 | 26.4 | 0.9 |
| March 1 | 10.55 | 0.42 | 6.8 | 0.8 | 14.85 | 0.30 | 45.8 | 0.7 | 40 | 24.90 | 20.90 | 25.5 | 0.4 |
| 11 | 10.97 | 0.41 | 6.0 | 0.0 | 15.15 | 0.31 | 45.1 | 0.2 | 40 | 45.80 | 21.00 | 25.1 | 0.1 |
| 21 | 11.38 | 0.40 | 6.0 | 0.6 | 15.46 | 0.29 | 44.9 | 0.3 | 41 | 6.80 | 20.71 | 25.2 | 0.5 |
| 31 | 11.78 | 0.38 | 6.6 | 1.3 | 15.75 | 0.28 | 45.2 | 0.5 | 41 | 27.51 | 19.75 | 25.7 | 1.1 |
| April 10 | 12.16 | 0.35 | 7.9 | 1.7 | 16.03 | 0.27 | 45.7 | 0.9 | 41 | 47.26 | 18.52 | 26.8 | 1.5 |
| 20 | 12.51 | 0.30 | 9.6 | 2.2 | 16.30 | 0.24 | 46.6 | 1.3 | 42 | 5.78 | 17.02 | 28.3 | 1.9 |
| 30 | 12.81 | 0.27 | 11.8 | 2.6 | 16.54 | 0.22 | 47.9 | 1.5 | 42 | 22.80 | 15.08 | 30.2 | 2.3 |
| May 10 | 13.08 | 0.22 | 14.4 | 3.0 | 16.76 | 0.20 | 49.4 | 1.8 | 42 | 37.88 | 12.88 | 32.5 | 2.6 |
| 20 | 13.30 | 0.16 | 17.4 | 3.2 | 16.96 | 0.17 | 51.2 | 2.0 | 42 | 50.76 | 10.41 | 35.1 | 2.9 |
| 30 | 13.46 | 0.11 | 20.6 | 3.3 | 17.13 | 0.14 | 53.2 | 2.0 | 43 | 1.17 | 7.65 | 38.0 | 3.1 |
| June 9 | 13.57 | 0.04 | 23.9 | 3.3 | 17.27 | 0.10 | 55.2 | 1.9 | 43 | 8.82 | 4.80 | 41.1 | 3.3 |
| 19 | 13.61 | 0.01 | 27.2 | 3.2 | 17.37 | 0.06 | 57.1 | 1.9 | 43 | 13.62 | 1.78 | 44.4 | 3.3 |
| 29 | 13.60 | 0.08 | 30.4 | 3.0 | 17.43 | 0.03 | 59.0 | 1.7 | 43 | 15.40 | 1.19 | 47.7 | 3.2 |
| July 9 | 13.52 | 0.13 | 33.4 | 2.8 | 17.46 | 0.02 | 60.7 | 1.6 | 43 | 14.21 | 4.16 | 50.9 | 3.0 |
| 19 | 13.39 | 0.18 | 36.2 | 2.4 | 17.44 | 0.05 | 62.3 | 1.4 | 43 | 10.05 | 6.97 | 53.9 | 2.8 |
| 29 | 13.21 | 0.23 | 38.6 | 2.0 | 17.39 | 0.09 | 63.7 | 1.2 | 43 | 3.08 | 9.56 | 56.7 | 2.5 |
| Aug. 8 | 13.98 | 0.28 | 40.6 | 1.4 | 17.30 | 0.12 | 64.9 | 0.9 | 42 | 53.52 | 11.82 | 59.2 | 2.0 |
| 18 | 12.70 | 0.31 | 42.0 | 0.9 | 17.18 | 0.14 | 65.8 | 0.6 | 42 | 41.70 | 13.67 | 61.2 | 1.4 |
| 28 | 12.39 | 0.34 | 42.9 | 0.5 | 17.04 | 0.17 | 66.4 | 0.4 | 42 | 28.03 | 15.06 | 62.6 | 1.0 |
| Sept. 7 | 12.05 | 0.35 | 43.4 | 0.0 | 16.87 | 0.17 | 66.8 | 0.1 | 42 | 12.97 | 15.84 | 63.6 | 0.3 |
| 17 | 11.70 | 0.34 | 43.4 | 0.6 | 16.70 | 0.18 | 66.9 | 0.3 | 41 | 57.13 | 16.03 | 63.9 | 0.3 |
| 27 | 11.36 | 0.34 | 42.8 | 1.0 | 16.52 | 0.16 | 66.6 | 0.5 | 41 | 41.10 | 15.57 | 63.6 | 1.0 |
| Oct. 7 | 11.02 | 0.32 | 41.8 | 1.5 | 16.36 | 0.15 | 66.1 | 0.8 | 41 | 25.53 | 14.47 | 62.6 | 1.4 |
| 17 | 10.70 | 0.28 | 40.3 | 2.0 | 16.21 | 0.13 | 65.3 | 1.0 | 41 | 11.06 | 12.73 | 61.2 | 1.9 |
| 27 | 10.42 | 0.22 | 38.3 | 2.4 | 16.08 | 0.09 | 64.3 | 1.3 | 40 | 58.33 | 10.49 | 59.3 | 2.4 |
| Nov. 6 | 10.20 | 0.17 | 35.9 | 2.7 | 15.99 | 0.04 | 63.0 | 1.6 | 40 | 47.84 | 7.71 | 56.9 | 2.8 |
| 16 | 10.03 | 0.12 | 33.2 | 3.1 | 15.95 | 0.00 | 61.4 | 1.8 | 40 | 40.13 | 4.59 | 54.1 | 3.0 |
| 26 | 9.91 | 0.04 | 30.1 | 3.3 | 15.95 | 0.04 | 59.6 | 2.0 | 40 | 35.54 | 1.24 | 51.1 | 3.1 |
| Dec. 6 | 9.87 | 0.03 | 26.8 | 3.5 | 15.99 | 0.10 | 57.6 | 2.1 | 40 | 34.30 | 2.16 | 48.0 | 3.2 |
| 16 | 9.90 | 0.10 | 23.3 | 3.5 | 16.09 | 0.15 | 55.5 | 2.2 | 40 | 36.46 | 5.62 | 44.8 | 3.1 |
| 26 | 10.00 | 0.17 | 19.8 | 3.4 | 16.24 | 0.18 | 53.3 | 2.2 | 40 | 42.08 | 8.85 | 41.7 | 3.0 |
| 36 | 10.17 | | 16.4 | | 16.42 | | 51.1 | | 40 | 50.93 | | 38.7 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | γ Draconis. | | μ¹ Sagittarii. | | α Lyræ. (*Vega.*) | |
|---|---|---|---|---|---|---|
| | Right Ascension. | Dec. *North.* | Right Ascension. | Dec. *South.* | Right Ascension. | Dec. *North.* |
| | h. m.<br>17 53<br>s. s. | ° ′<br>51 29<br>″ ″ | h. m.<br>18 5<br>s. s. | ° ′<br>21 5<br>″ ″ | h. m.<br>18 32<br>s. s. | ° ′<br>38 38<br>″ ″ |
| Jan. 1 | 13.45 0.17 | 75.1 3.5 | 7.00 0.21 | 39.5 0.2 | 1.60 0.11 | 58.6 3.1 |
| 11 | 13.62 0.23 | 71.6 3.1 | 7.21 0.24 | 39.7 0.3 | 1.71 0.17 | 55.5 3.0 |
| 21 | 13.85 0.28 | 68.5 2.9 | 7.45 0.27 | 40.0 0.3 | 1.88 0.22 | 52.5 2.8 |
| 31 | 14.13 0.32 | 65.6 2.6 | 7.72 0.29 | 40.3 0.3 | 2.10 0.26 | 49.7 2.5 |
| Feb. 10 | 14.45 0.36 | 63.0 2.1 | 8.01 0.31 | 40.6 0.3 | 2.36 0.28 | 47.2 2.1 |
| 20 | 14.81 0.39 | 60.9 1.6 | 8.32 0.32 | 40.9 0.2 | 2.64 0.31 | 45.1 1.8 |
| March 1 | 15.20 0.41 | 59.3 1.0 | 8.64 0.33 | 41.1 0.1 | 2.95 0.32 | 43.3 1.2 |
| 11 | 15.61 0.41 | 58.3 0.4 | 8.97 0.33 | 41.2 0.1 | 3.27 0.34 | 42.1 0.6 |
| 21 | 16.02 0.40 | 57.9 0.3 | 9.30 0.33 | 41.3 0.1 | 3.61 0.34 | 41.5 0.0 |
| 31 | 16.42 0.39 | 58.2 0.9 | 9.63 0.32 | 41.2 0.1 | 3.95 0.35 | 41.5 0.6 |
| April 10 | 16.81 0.36 | 59.1 1.5 | 9.95 0.31 | 41.1 0.2 | 4.30 0.33 | 42.1 1.2 |
| 20 | 17.17 0.34 | 60.6 2.1 | 10.26 0.30 | 40.9 0.2 | 4.63 0.32 | 43.3 1.6 |
| 30 | 17.51 0.29 | 62.7 2.5 | 10.56 0.28 | 40.7 0.3 | 4.95 0.29 | 44.9 2.1 |
| May 10 | 17.80 0.24 | 65.2 2.9 | 10.84 0.26 | 40.4 0.3 | 5.24 0.26 | 47.0 2.5 |
| 20 | 18.04 0.20 | 68.1 3.2 | 11.10 0.23 | 40.1 0.3 | 5.50 0.23 | 49.5 2.8 |
| 30 | 18.24 0.15 | 71.3 3.3 | 11.33 0.20 | 39.8 0.2 | 5.73 0.20 | 52.3 3.1 |
| June 9 | 18.39 0.09 | 74.6 3.3 | 11.53 0.17 | 39.6 0.2 | 5.93 0.15 | 55.4 3.1 |
| 19 | 18.48 0.02 | 77.9 3.3 | 11.70 0.13 | 39.4 0.1 | 6.08 0.10 | 58.5 3.2 |
| 29 | 18.50 0.03 | 81.2 3.1 | 11.83 0.09 | 39.3 0.1 | 6.18 0.04 | 61.7 3.1 |
| July 9 | 18.47 0.09 | 84.3 2.9 | 11.92 0.04 | 39.2 0.0 | 6.22 0.01 | 64.8 2.9 |
| 19 | 18.38 0.15 | 87.2 2.6 | 11.96 0.00 | 39.2 0.1 | 6.21 0.05 | 67.7 2.7 |
| 29 | 18.23 0.21 | 89.8 2.2 | 11.96 0.05 | 39.3 0.1 | 6.16 0.09 | 70.4 2.3 |
| Aug. 8 | 18.02 0.25 | 92.0 1.8 | 11.91 0.08 | 39.4 0.1 | 6.07 0.16 | 72.7 2.0 |
| 18 | 17.77 0.29 | 93.8 1.4 | 11.83 0.13 | 39.5 0.2 | 5.91 0.18 | 74.7 1.7 |
| 28 | 17.48 0.31 | 95.2 0.9 | 11.70 0.15 | 39.7 0.1 | 5.73 0.21 | 76.4 1.3 |
| Sept. 7 | 17.17 0.32 | 96.1 0.4 | 11.55 0.16 | 39.8 0.1 | 5.52 0.23 | 77.7 0.7 |
| 17 | 16.85 0.35 | 96.5 0.2 | 11.39 0.17 | 39.9 0.0 | 5.29 0.25 | 78.4 0.1 |
| 27 | 16.50 0.35 | 96.3 0.5 | 11.22 0.17 | 39.9 0.0 | 5.04 0.26 | 78.5 0.0 |
| Oct. 7 | 16.15 0.33 | 95.8 1.1 | 11.05 0.15 | 39.9 0.0 | 4.78 0.25 | 78.5 0.6 |
| 17 | 15.82 0.29 | 94.7 1.7 | 10.90 0.13 | 39.9 0.0 | 4.53 0.22 | 77.9 1.1 |
| 27 | 15.53 0.25 | 93.0 2.1 | 10.77 0.10 | 39.9 0.1 | 4.31 0.21 | 76.8 1.5 |
| Nov. 6 | 15.28 0.20 | 90.9 2.5 | 10.67 0.06 | 39.8 0.1 | 4.10 0.16 | 75.3 1.9 |
| 16 | 15.08 0.13 | 88.4 2.9 | 10.61 0.00 | 39.7 0.0 | 3.94 0.11 | 73.4 2.2 |
| 26 | 14.95 0.08 | 85.5 3.2 | 10.61 0.03 | 39.7 0.0 | 3.83 0.07 | 71.2 2.6 |
| Dec. 6 | 14.87 0.01 | 82.3 3.3 | 10.64 0.09 | 39.7 0.1 | 3.76 0.01 | 68.6 2.8 |
| 16 | 14.86 0.06 | 79.0 3.5 | 10.73 0.14 | 39.8 0.1 | 3.75 0.04 | 65.8 3.0 |
| 26 | 14.92 0.12 | 75.5 3.5 | 10.87 0.18 | 39.9 0.2 | 3.79 0.09 | 62.8 3.0 |
| 36 | 15.04 | 72.0 | 11.05 | 40.1 | 3.88 | 59.8 |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | β Lyræ. | | | | ζ Aquilæ. | | | | δ Aquilæ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 18 | m. 44 | ° 33 | ' 11 | h. 18 | m. 58 | ° 13 | ' 38 | h. 19 | m. 18 | ° 2 | ' 49 |
| | s. | s. | " | " | s. | s. | " | " | s. | s. | " | " |
| Jan. 1 | 43.72 | 0.11 | 43.9 | 2.8 | 45.54 | 0.11 | 61.2 | 2.0 | 12.36 | 0.11 | 42.9 | 1.4 |
| 11 | 43.83 | 0.16 | 41.1 | 2.8 | 45.65 | 0.16 | 59.2 | 2.0 | 12.47 | 0.15 | 41.5 | 1.3 |
| 21 | 43.99 | 0.20 | 38.3 | 2.7 | 45.81 | 0.19 | 57.2 | 1.8 | 12.62 | 0.18 | 40.2 | 1.3 |
| 31 | 44.19 | 0.23 | 35.6 | 2.4 | 46.00 | 0.22 | 55.4 | 1.7 | 12.80 | 0.20 | 38.9 | 1.2 |
| Feb. 10 | 44.42 | 0.27 | 33.2 | 2.1 | 46.22 | 0.24 | 53.7 | 1.5 | 13.00 | 0.23 | 37.7 | 1.0 |
| 20 | 44.69 | 0.29 | 31.1 | 1.7 | 46.46 | 0.25 | 52.2 | 1.1 | 13.23 | 0.25 | 36.7 | 0.7 |
| March 1 | 44.98 | 0.30 | 29.4 | 1.2 | 46.71 | 0.28 | 51.1 | 0.8 | 13.48 | 0.27 | 36.0 | 0.4 |
| 11 | 45.28 | 0.32 | 28.2 | 0.6 | 46.99 | 0.30 | 50.3 | 0.4 | 13.75 | 0.28 | 35.6 | 0.2 |
| 21 | 45.60 | 0.32 | 27.6 | 0.0 | 47.29 | 0.29 | 49.9 | 0.1 | 14.03 | 0.29 | 35.4 | 0.2 |
| 31 | 45.92 | 0.33 | 27.6 | 0.4 | 47.58 | 0.30 | 50.0 | 0.4 | 14.32 | 0.30 | 35.6 | 0.5 |
| April 10 | 46.25 | 0.32 | 28.0 | 1.0 | 47.88 | 0.30 | 50.4 | 0.8 | 14.62 | 0.30 | 36.1 | 0.8 |
| 20 | 46.57 | 0.31 | 29.0 | 1.5 | 48.18 | 0.29 | 51.2 | 1.3 | 14.92 | 0.30 | 36.9 | 1.1 |
| 30 | 46.88 | 0.29 | 30.5 | 2.0 | 48.47 | 0.28 | 52.5 | 1.6 | 15.22 | 0.29 | 38.0 | 1.3 |
| May 10 | 47.17 | 0.27 | 32.5 | 2.4 | 48.75 | 0.27 | 54.1 | 1.9 | 15.51 | 0.28 | 39.3 | 1.6 |
| 20 | 47.44 | 0.24 | 34.9 | 2.7 | 49.02 | 0.24 | 56.0 | 2.0 | 15.79 | 0.27 | 40.9 | 1.7 |
| 30 | 47.68 | 0.19 | 37.6 | 2.9 | 49.26 | 0.21 | 58.0 | 2.2 | 16.06 | 0.23 | 42.6 | 1.8 |
| June 9 | 47.87 | 0.16 | 40.5 | 2.9 | 49.47 | 0.18 | 60.2 | 2.2 | 16.29 | 0.20 | 44.4 | 1.8 |
| 19 | 48.03 | 0.13 | 43.4 | 3.0 | 49.65 | 0.15 | 62.4 | 2.3 | 16.49 | 0.18 | 46.2 | 1.7 |
| 29 | 48.16 | 0.07 | 46.4 | 3.0 | 49.80 | 0.11 | 64.7 | 2.2 | 16.67 | 0.14 | 47.9 | 1.6 |
| July 9 | 48.23 | 0.02 | 49.4 | 2.8 | 49.91 | 0.06 | 66.9 | 2.1 | 16.81 | 0.08 | 49.5 | 1.5 |
| 19 | 48.25 | 0.02 | 52.2 | 2.6 | 49.97 | 0.02 | 69.0 | 1.8 | 16.89 | 0.05 | 51.0 | 1.4 |
| 29 | 48.23 | 0.07 | 54.8 | 2.3 | 49.99 | 0.02 | 70.8 | 1.6 | 16.94 | 0.00 | 52.4 | 1.2 |
| Aug. 8 | 48.16 | 0.13 | 57.1 | 2.0 | 49.97 | 0.07 | 72.4 | 1.4 | 16.94 | 0.04 | 53.6 | 1.0 |
| 18 | 48.03 | 0.15 | 59.1 | 1.6 | 49.90 | 0.10 | 73.8 | 1.2 | 16.90 | 0.07 | 54.6 | 0.8 |
| 28 | 47.88 | 0.18 | 60.7 | 1.3 | 49.80 | 0.13 | 75.0 | 0.9 | 16.83 | 0.11 | 55.4 | 0.6 |
| Sept. 7 | 47.70 | 0.21 | 62.0 | 0.8 | 49.67 | 0.16 | 75.9 | 0.5 | 16.72 | 0.13 | 56.0 | 0.3 |
| 17 | 47.49 | 0.23 | 62.8 | 0.3 | 49.51 | 0.17 | 76.4 | 0.2 | 16.59 | 0.16 | 56.3 | 0.1 |
| 27 | 47.26 | 0.23 | 63.1 | 0.0 | 49.34 | 0.19 | 76.6 | 0.0 | 16.43 | 0.16 | 56.4 | 0.0 |
| Oct. 7 | 47.03 | 0.22 | 63.1 | 0.4 | 49.15 | 0.17 | 76.6 | 0.3 | 16.27 | 0.16 | 56.4 | 0.2 |
| 17 | 46.81 | 0.21 | 62.7 | 1.0 | 48.98 | 0.16 | 76.3 | 0.6 | 16.11 | 0.15 | 56.2 | 0.5 |
| 27 | 46.60 | 0.18 | 61.7 | 1.4 | 48.82 | 0.13 | 75.7 | 0.9 | 15.96 | 0.13 | 55.7 | 0.7 |
| Nov. 6 | 46.42 | 0.15 | 60.3 | 1.6 | 48.69 | 0.11 | 74.8 | 1.1 | 15.83 | 0.11 | 55.0 | 0.8 |
| 16 | 46.27 | 0.10 | 58.7 | 2.0 | 48.58 | 0.08 | 73.7 | 1.4 | 15.72 | 0.07 | 54.2 | 0.9 |
| 26 | 46.17 | 0.07 | 56.7 | 2.4 | 48.50 | 0.03 | 72.3 | 1.6 | 15.65 | 0.03 | 53.3 | 1.0 |
| Dec. 6 | 46.10 | 0.01 | 54.3 | 2.6 | 48.47 | 0.02 | 70.7 | 1.8 | 15.62 | 0.00 | 52.3 | 1.2 |
| 16 | 46.09 | 0.02 | 51.7 | 2.7 | 48.49 | 0.05 | 68.9 | 1.9 | 15.62 | 0.05 | 51.1 | 1.3 |
| 26 | 46.11 | 0.09 | 49.0 | 2.8 | 48.54 | 0.09 | 67.0 | 1.9 | 15.67 | 0.08 | 49.8 | 1.3 |
| 36 | 46.20 | | 46.2 | | 48.63 | | 65.1 | | 15.75 | | 48.5 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | γ Aquilæ. | | | | α Aquilæ. (*Altair.*) | | | | β Aquilæ. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 19 | m. 39 | ° 10 | ′ 15 | h. 19 | m. 43 | ° 8 | ′ 29 | h. 19 | m. 48 | ° 6 | ′ 2 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 22.94 | 0.07 | 47.3 | 1.7 | 43.56 | 0.07 | 20.0 | 1.6 | 12.53 | 0.08 | 52.1 | 1.5 |
| 11 | 23.01 | 0.12 | 45.6 | 1.7 | 43.63 | 0.12 | 18.4 | 1.6 | 12.61 | 0.11 | 50.6 | 1.4 |
| 21 | 23.13 | 0.15 | 43.9 | 1.6 | 43.75 | 0.16 | 16.8 | 1.5 | 12.72 | 0.15 | 49.2 | 1.4 |
| 31 | 23.28 | 0.18 | 42.3 | 1.5 | 43.91 | 0.17 | 15.3 | 1.3 | 12.87 | 0.17 | 47.8 | 1.2 |
| Feb. 10 | 23.46 | 0.21 | 40.8 | 1.2 | 44.08 | 0.21 | 14.0 | 1.1 | 13.04 | 0.20 | 46.6 | 1.0 |
| 20 | 23.67 | 0.24 | 39.6 | 1.0 | 44.29 | 0.23 | 12.9 | 0.9 | 13.24 | 0.23 | 45.6 | 0.9 |
| March 1 | 23.91 | 0.26 | 38.6 | 0.8 | 44.52 | 0.25 | 12.0 | 0.7 | 13.47 | 0.26 | 44.7 | 0.5 |
| 11 | 24.17 | 0.28 | 37.8 | 0.6 | 44.77 | 0.27 | 11.3 | 0.3 | 13.73 | 0.27 | 44.2 | 0.3 |
| 21 | 24.45 | 0.28 | 37.2 | 0.2 | 45.04 | 0.29 | 11.0 | 0.2 | 14.00 | 0.28 | 43.9 | 0.1 |
| 31 | 24.73 | 0.29 | 37.4 | 0.6 | 45.33 | 0.30 | 11.2 | 0.5 | 14.28 | 0.29 | 44.0 | 0.5 |
| April 10 | 25.02 | 0.30 | 38.0 | 0.9 | 45.63 | 0.29 | 11.7 | 0.8 | 14.57 | 0.29 | 44.5 | 0.9 |
| 20 | 25.32 | 0.30 | 38.9 | 1.1 | 45.92 | 0.31 | 12.5 | 1.1 | 14.86 | 0.32 | 45.4 | 1.1 |
| 30 | 25.62 | 0.30 | 40.0 | 1.5 | 46.23 | 0.30 | 13.6 | 1.4 | 15.18 | 0.29 | 46.5 | 1.4 |
| May 10 | 25.92 | 0.29 | 41.5 | 1.8 | 46.53 | 0.29 | 15.0 | 1.8 | 15.47 | 0.29 | 47.9 | 1.6 |
| 20 | 26.21 | 0.27 | 43.3 | 2.0 | 46.82 | 0.28 | 16.8 | 2.0 | 15.76 | 0.28 | 49.5 | 1.9 |
| 30 | 26.48 | 0.25 | 45.3 | 2.1 | 47.10 | 0.25 | 18.8 | 2.0 | 16.04 | 0.26 | 51.4 | 2.0 |
| June 9 | 26.73 | 0.21 | 47.4 | 2.1 | 47.35 | 0.22 | 20.8 | 2.1 | 16.30 | 0.22 | 53.4 | 2.0 |
| 19 | 26.94 | 0.19 | 49.5 | 2.2 | 47.57 | 0.19 | 22.9 | 2.2 | 16.52 | 0.19 | 55.4 | 1.9 |
| 29 | 27.13 | 0.15 | 51.7 | 2.1 | 47.76 | 0.15 | 25.1 | 2.1 | 16.71 | 0.17 | 57.3 | 1.9 |
| July 9 | 27.28 | 0.11 | 53.8 | 2.0 | 47.91 | 0.11 | 27.2 | 1.9 | 16.88 | 0.11 | 59.2 | 1.8 |
| 19 | 27.39 | 0.05 | 55.8 | 1.9 | 48.02 | 0.07 | 29.1 | 1.8 | 16.99 | 0.07 | 61.0 | 1.7 |
| 29 | 27.44 | 0.02 | 57.7 | 1.7 | 48.09 | 0.01 | 30.9 | 1.5 | 17.06 | 0.03 | 62.7 | 1.4 |
| Aug. 8 | 27.46 | 0.03 | 59.4 | 1.4 | 48.10 | 0.01 | 32.4 | 1.3 | 17.09 | 0.01 | 64.1 | 1.2 |
| 18 | 27.43 | 0.06 | 60.8 | 1.2 | 48.09 | 0.06 | 33.7 | 1.2 | 17.08 | 0.07 | 65.3 | 1.0 |
| 28 | 27.37 | 0.11 | 62.0 | 0.9 | 48.03 | 0.11 | 34.9 | 1.0 | 17.01 | 0.09 | 66.3 | 0.8 |
| Sept. 7 | 27.26 | 0.13 | 62.9 | 0.7 | 47.92 | 0.12 | 35.9 | 0.6 | 16.92 | 0.11 | 67.1 | 0.6 |
| 17 | 27.13 | 0.15 | 63.6 | 0.4 | 47.80 | 0.15 | 36.5 | 0.3 | 16.81 | 0.15 | 67.7 | 0.3 |
| 27 | 26.98 | 0.16 | 64.0 | 0.1 | 47.65 | 0.16 | 36.8 | 0.2 | 16.66 | 0.16 | 68.0 | 0.1 |
| Oct. 7 | 26.82 | 0.18 | 64.1 | 0.1 | 47.49 | 0.16 | 37.0 | 0.2 | 16.50 | 0.16 | 68.1 | 0.2 |
| 17 | 26.64 | 0.15 | 64.0 | 0.4 | 47.33 | 0.16 | 36.8 | 0.3 | 16.34 | 0.16 | 67.9 | 0.3 |
| 27 | 26.49 | 0.14 | 63.6 | 0.6 | 47.17 | 0.14 | 36.5 | 0.6 | 16.18 | 0.13 | 67.6 | 0.5 |
| Nov. 6 | 26.35 | 0.12 | 63.0 | 0.9 | 47.03 | 0.12 | 35.9 | 0.8 | 16.05 | 0.13 | 67.1 | 0.7 |
| 16 | 26.23 | 0.09 | 62.1 | 1.1 | 46.91 | 0.09 | 35.1 | 1.0 | 15.92 | 0.09 | 66.4 | 1.0 |
| 26 | 26.14 | 0.06 | 61.0 | 1.3 | 46.82 | 0.06 | 34.1 | 1.2 | 15.83 | 0.05 | 65.4 | 1.2 |
| Dec. 6 | 26.08 | 0.02 | 59.7 | 1.5 | 46.76 | 0.02 | 32.9 | 1.4 | 15.78 | 0.02 | 64.2 | 1.3 |
| 16 | 26.06 | 0.02 | 58.2 | 1.5 | 46.74 | 0.03 | 31.5 | 1.4 | 15.76 | 0.01 | 62.9 | 1.3 |
| 26 | 26.08 | 0.06 | 56.7 | 1.6 | 46.77 | 0.05 | 30.1 | 1.5 | 15.77 | 0.06 | 61.6 | 1.4 |
| 36 | 26.14 | | 55.1 | | 46.82 | | 28.6 | | 15.83 | | 60.2 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | λ Ursæ Minoris. | | | | $\alpha^2$ Capricorni. | | | | α Pavonis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 20 | | ° ′ 88 52 | | h. m. 20 10 | | ° ′ 12 59 | | h. m. 20 14 | | ° ′ 57 11 | |
| | m. s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 6 26.62 | 5.36 | 42.3 | 2.9 | 1.89 | 0.06 | 27.5 | 0.3 | 11.35 | 0.08 | 44.7 | 2.2 |
| 11 | 6 21.26 | 3.16 | 39.4 | 3.0 | 1.95 | 0.12 | 27.8 | 0.3 | 11.43 | 0.15 | 42.5 | 2.3 |
| 21 | 6 18.10 | 0.92 | 36.4 | 3.1 | 2.07 | 0.14 | 28.1 | 0.2 | 11.58 | 0.22 | 40.2 | 2.3 |
| 31 | 6 17.18 | 1.20 | 33.3 | 3.2 | 2.21 | 0.16 | 28.3 | 0.1 | 11.80 | 0.27 | 37.9 | 2.4 |
| Feb. 10 | 6 18.38 | 3.28 | 30.1 | 3.0 | 2.37 | 0.20 | 28.4 | 0.1 | 12.07 | 0.32 | 35.5 | 2.3 |
| 20 | 6 21.66 | 5.24 | 27.1 | 2.7 | 2.57 | 0.23 | 28.3 | 0.1 | 12.39 | 0.38 | 33.2 | 2.3 |
| March 1 | 6 26.90 | 7.19 | 24.4 | 2.4 | 2.80 | 0.25 | 28.2 | 0.3 | 12.77 | 0.42 | 30.9 | 2.1 |
| 11 | 6 34.09 | 8.45 | 22.0 | 2.0 | 3.05 | 0.27 | 27.9 | 0.6 | 13.19 | 0.45 | 28.8 | 1.9 |
| 21 | 6 42.54 | 9.50 | 20.0 | 1.5 | 3.32 | 0.28 | 27.3 | 0.7 | 13.64 | 0.48 | 26.9 | 1.7 |
| 31 | 6 52.04 | 10.16 | 18.5 | 0.8 | 3.60 | 0.30 | 26.6 | 0.9 | 14.12 | 0.52 | 25.2 | 1.5 |
| April 10 | 7 2.20 | 10.42 | 17.7 | 0.2 | 3.90 | 0.31 | 25.7 | 1.0 | 14.64 | 0.53 | 23.7 | 1.3 |
| 20 | 7 12.62 | 10.19 | 17.5 | 0.4 | 4.21 | 0.32 | 24.7 | 1.2 | 15.17 | 0.53 | 22.4 | 0.9 |
| 30 | 7 22.81 | 9.70 | 17.9 | 1.0 | 4.53 | 0.31 | 23.5 | 1.3 | 15.70 | 0.53 | 21.5 | 0.6 |
| May 10 | 7 32.51 | 8.85 | 18.9 | 1.6 | 4.84 | 0.31 | 22.2 | 1.3 | 16.23 | 0.53 | 20.9 | 0.3 |
| 20 | 7 41.36 | 7.69 | 20.5 | 2.1 | 5.15 | 0.32 | 20.9 | 1.3 | 16.76 | 0.49 | 20.6 | 0.2 |
| 30 | 7 49.05 | 6.30 | 22.6 | 2.5 | 5.47 | 0.28 | 19.6 | 1.3 | 17.25 | 0.47 | 20.8 | 0.4 |
| June 9 | 7 55.35 | 4.71 | 25.1 | 2.9 | 5.75 | 0.26 | 18.3 | 1.2 | 17.72 | 0.43 | 21.2 | 0.8 |
| 19 | 8 0.06 | 2.99 | 28.0 | 3.2 | 6.01 | 0.23 | 17.1 | 1.1 | 18.15 | 0.38 | 22.0 | 1.2 |
| 29 | 8 3.05 | 1.18 | 31.2 | 3.4 | 6.24 | 0.20 | 16.0 | 1.0 | 18.53 | 0.31 | 23.2 | 1.5 |
| July 9 | 8 4.23 | 0.63 | 34.6 | 3.5 | 6.44 | 0.15 | 15.0 | 0.8 | 18.84 | 0.25 | 24.7 | 1.7 |
| 19 | 8 3.60 | 2.46 | 38.1 | 3.5 | 6.59 | 0.11 | 14.2 | 0.6 | 19.09 | 0.17 | 26.4 | 2.0 |
| 29 | 8 1.14 | 4.23 | 41.6 | 3.5 | 6.70 | 0.05 | 13.6 | 0.4 | 19.26 | 0.09 | 28.4 | 2.0 |
| Aug. 8 | 7 56.91 | 5.95 | 45.1 | 3.3 | 6.75 | 0.01 | 13.2 | 0.3 | 19.35 | 0.00 | 30.4 | 2.1 |
| 18 | 7 50.96 | 7.50 | 48.4 | 3.0 | 6.76 | 0.02 | 12.9 | 0.1 | 19.35 | 0.07 | 32.5 | 2.0 |
| 28 | 7 43.46 | 8.92 | 51.4 | 2.8 | 6.74 | 0.07 | 12.8 | 0.0 | 19.28 | 0.13 | 34.5 | 1.8 |
| Sept. 7 | 7 34.54 | 10.19 | 54.2 | 2.4 | 6.67 | 0.10 | 12.8 | 0.1 | 19.15 | 0.20 | 36.3 | 1.7 |
| 17 | 7 24.35 | 11.27 | 56.6 | 2.0 | 6.57 | 0.12 | 12.9 | 0.2 | 18.95 | 0.24 | 38.0 | 1.4 |
| 27 | 7 13.08 | 12.08 | 58.6 | 1.6 | 6.45 | 0.15 | 13.1 | 0.3 | 18.71 | 0.29 | 39.4 | 1.0 |
| Oct. 7 | 7 1.00 | 12.66 | 60.2 | 1.1 | 6.30 | 0.16 | 13.4 | 0.3 | 18.42 | 0.32 | 40.4 | 0.6 |
| 17 | 6 48.34 | 13.00 | 61.3 | 0.6 | 6.14 | 0.15 | 13.7 | 0.4 | 18.10 | 0.31 | 41.0 | 0.3 |
| 27 | 6 35.34 | 13.03 | 61.9 | 0.0 | 5.99 | 0.13 | 14.1 | 0.4 | 17.79 | 0.29 | 41.3 | 0.2 |
| Nov. 6 | 6 22.31 | 12.76 | 61.9 | 0.4 | 5.86 | 0.12 | 14.5 | 0.3 | 17.50 | 0.26 | 41.1 | 0.6 |
| 16 | 6 9.55 | 12.12 | 61.5 | 0.9 | 5.74 | 0.10 | 14.8 | 0.4 | 17.24 | 0.22 | 40.5 | 1.0 |
| 26 | 5 57.43 | 11.19 | 60.6 | 1.5 | 5.64 | 0.06 | 15.2 | 0.3 | 17.02 | 0.16 | 39.5 | 1.4 |
| Dec. 6 | 5 46.24 | 9.96 | 59.1 | 1.9 | 5.58 | 0.02 | 15.5 | 0.4 | 16.86 | 0.10 | 38.1 | 1.6 |
| 16 | 5 36.28 | 8.38 | 57.2 | 2.4 | 5.56 | 0.01 | 15.9 | 0.3 | 16.76 | 0.03 | 36.5 | 1.9 |
| 26 | 5 27.90 | 6.55 | 54.8 | 2.7 | 5.57 | 0.05 | 16.2 | 0.3 | 16.73 | 0.03 | 34.6 | 2.1 |
| 36 | 5 21.35 | | 52.1 | | 5.62 | | 16.5 | | 16.76 | | 32.5 | |

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | α Cygni. | | | | 61¹ Cygni. | | | | ζ Cygni. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 20 | m. 36 | ° 44 | ′ 45 | h. 21 | m. 0 | ° 38 | ′ 2 | h. 21 | m. 6 | ° 29 | ′ 37 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 29.05 | 0.04 | 61.6 | 2.6 | 24.48 | 0.03 | 35.5 | 2.3 | 46.63 | 0.02 | 75.3 | 2.1 |
| 11 | 29.01 | 0.01 | 59.0 | 2.7 | 24.45 | 0.01 | 33.2 | 2.4 | 46.61 | 0.01 | 73.2 | 2.2 |
| 21 | 29.02 | 0.05 | 56.3 | 2.9 | 24.44 | 0.06 | 30.8 | 2.5 | 46.60 | 0.05 | 71.0 | 2.3 |
| 31 | 29.07 | 0.11 | 53.4 | 2.9 | 24.50 | 0.09 | 28.3 | 2.5 | 46.65 | 0.08 | 68.7 | 2.2 |
| Feb. 10 | 29.18 | 0.15 | 50.5 | 2.7 | 24.59 | 0.14 | 25.8 | 2.3 | 46.73 | 0.12 | 66.5 | 2.1 |
| 20 | 29.33 | 0.21 | 47.8 | 2.4 | 24.73 | 0.17 | 23.5 | 2.1 | 46.85 | 0.16 | 64.4 | 1.9 |
| March 1 | 29.54 | 0.24 | 45.4 | 2.0 | 24.90 | 0.22 | 21.4 | 1.9 | 47.01 | 0.19 | 62.5 | 1.6 |
| 11 | 29.78 | 0.29 | 43.4 | 1.5 | 25.12 | 0.26 | 19.5 | 1.5 | 47.20 | 0.22 | 60.9 | 1.2 |
| 21 | 30.07 | 0.31 | 41.9 | 1.1 | 25.38 | 0.29 | 18.0 | 0.9 | 47.42 | 0.25 | 59.7 | 0.8 |
| 31 | 30.38 | 0.34 | 40.8 | 0.7 | 25.67 | 0.30 | 17.1 | 0.4 | 47.67 | 0.29 | 58.9 | 0.3 |
| April 10 | 30.72 | 0.37 | 40.1 | 0.1 | 25.97 | 0.34 | 16.7 | 0.2 | 47.96 | 0.31 | 58.6 | 0.3 |
| 20 | 31.09 | 0.37 | 40.2 | 0.7 | 26.31 | 0.35 | 16.9 | 0.6 | 48.27 | 0.33 | 58.9 | 0.7 |
| 30 | 31.46 | 0.37 | 40.9 | 1.2 | 26.66 | 0.36 | 17.5 | 1.2 | 48.60 | 0.34 | 59.6 | 1.2 |
| May 10 | 31.83 | 0.37 | 42.1 | 1.8 | 27.02 | 0.36 | 18.7 | 1.7 | 48.94 | 0.34 | 60.8 | 1.6 |
| 20 | 32.20 | 0.36 | 43.9 | 2.3 | 27.38 | 0.35 | 20.4 | 2.1 | 49.28 | 0.33 | 62.4 | 2.1 |
| 30 | 32.56 | 0.33 | 46.2 | 2.7 | 27.73 | 0.33 | 22.5 | 2.7 | 49.61 | 0.30 | 64.5 | 2.4 |
| June 9 | 32.89 | 0.28 | 48.9 | 3.0 | 28.06 | 0.31 | 25.2 | 2.9 | 49.91 | 0.28 | 66.9 | 2.7 |
| 19 | 33.17 | 0.25 | 51.9 | 3.3 | 28.37 | 0.27 | 28.1 | 3.2 | 50.19 | 0.25 | 69.6 | 2.9 |
| 29 | 33.42 | 0.20 | 55.2 | 3.4 | 28.64 | 0.23 | 31.3 | 3.3 | 50.44 | 0.22 | 72.5 | 3.0 |
| July 9 | 33.62 | 0.15 | 58.6 | 3.5 | 28.87 | 0.18 | 34.6 | 3.4 | 50.66 | 0.19 | 75.5 | 3.0 |
| 19 | 33.77 | 0.08 | 62.1 | 3.4 | 29.05 | 0.13 | 38.0 | 3.3 | 50.85 | 0.13 | 78.5 | 3.0 |
| 29 | 33.85 | 0.03 | 65.5 | 3.3 | 29.18 | 0.09 | 41.3 | 3.3 | 50.98 | 0.09 | 81.5 | 2.9 |
| Aug. 8 | 33.88 | 0.03 | 68.8 | 3.1 | 29.27 | 0.02 | 44.6 | 3.1 | 51.07 | 0.03 | 84.4 | 2.7 |
| 18 | 33.85 | 0.08 | 71.9 | 2.8 | 29.29 | 0.02 | 47.7 | 2.9 | 51.10 | 0.00 | 87.1 | 2.4 |
| 28 | 33.77 | 0.14 | 74.7 | 2.5 | 29.27 | 0.06 | 50.6 | 2.6 | 51.10 | 0.05 | 89.5 | 2.1 |
| Sept. 7 | 33.63 | 0.17 | 77.2 | 2.2 | 29.21 | 0.11 | 53.2 | 2.2 | 51.05 | 0.10 | 91.6 | 1.9 |
| 17 | 33.46 | 0.20 | 79.4 | 1.8 | 29.10 | 0.15 | 55.4 | 1.8 | 50.95 | 0.13 | 93.5 | 1.6 |
| 27 | 33.26 | 0.23 | 81.2 | 1.4 | 28.95 | 0.18 | 57.2 | 1.5 | 50.82 | 0.16 | 95.1 | 1.2 |
| Oct. 7 | 33.03 | 0.25 | 82.6 | 0.9 | 28.77 | 0.19 | 58.7 | 1.1 | 50.66 | 0.17 | 96.3 | 0.8 |
| 17 | 32.78 | 0.27 | 83.5 | 0.3 | 28.58 | 0.20 | 59.8 | 0.6 | 50.49 | 0.18 | 97.1 | 0.3 |
| 27 | 32.51 | 0.26 | 83.8 | 0.1 | 28.38 | 0.22 | 60.4 | 0.1 | 50.31 | 0.18 | 97.4 | 0.0 |
| Nov. 6 | 32.25 | 0.24 | 83.7 | 0.6 | 28.16 | 0.20 | 60.5 | 0.2 | 50.13 | 0.18 | 97.4 | 0.4 |
| 16 | 32.01 | 0.22 | 83.1 | 1.0 | 27.96 | 0.19 | 60.3 | 0.7 | 49.95 | 0.16 | 97.0 | 0.8 |
| 26 | 31.79 | 0.20 | 82.1 | 1.5 | 27.77 | 0.15 | 59.6 | 1.2 | 49.79 | 0.14 | 96.2 | 1.1 |
| Dec. 6 | 31.59 | 0.16 | 80.6 | 1.9 | 27.62 | 0.13 | 58.4 | 1.5 | 49.65 | 0.11 | 95.1 | 1.4 |
| 16 | 31.43 | 0.11 | 78.7 | 2.2 | 27.49 | 0.09 | 56.9 | 1.8 | 49.54 | 0.08 | 93.7 | 1.8 |
| 26 | 31.32 | 0.07 | 76.5 | 2.5 | 27.40 | 0.06 | 55.1 | 2.1 | 49.46 | 0.05 | 91.9 | 2.0 |
| 36 | 31.25 | | 74.0 | | 27.34 | | 53.0 | | 49.41 | | 89.9 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | *α* Cephei. | | | | *β* Aquarii. | | | | *β* Cephei. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | |
| | h. 21 | m. 15 | ° 61 | ′ 58 | h. 21 | m. 23 | ° 6 | ′ 11 | h. 21 | m. 26 | ° 69 | ′ 55 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 5.16 | 0.21 | 38.3 | 2.5 | 56.97 | 0.00 | 78.3 | 0.5 | 42.95 | 0.36 | 49.6 | 2.5 |
| 11 | 4.95 | 0.14 | 35.8 | 2.9 | 56.97 | 0.03 | 78.8 | 0.5 | 42.59 | 0.26 | 47.1 | 2.7 |
| 21 | 4.81 | 0.06 | 32.9 | 3.1 | 57.00 | 0.06 | 79.3 | 0.4 | 42.33 | 0.15 | 44.4 | 3.0 |
| 31 | 4.75 | 0.02 | 29.8 | 3.1 | 57.06 | 0.09 | 79.7 | 0.3 | 42.18 | 0.05 | 41.4 | 3.2 |
| Feb. 10 | 4.77 | 0.10 | 26.7 | 3.0 | 57.15 | 0.12 | 80.0 | 0.1 | 42.13 | 0.07 | 38.2 | 3.1 |
| 20 | 4.87 | 0.19 | 23.7 | 3.0 | 57.27 | 0.15 | 80.1 | 0.0 | 42.20 | 0.18 | 35.1 | 3.1 |
| March 1 | 5.06 | 0.25 | 20.7 | 2.7 | 57.42 | 0.17 | 80.1 | 0.2 | 42.38 | 0.30 | 32.0 | 2.9 |
| 11 | 5.31 | 0.34 | 18.0 | 2.2 | 57.59 | 0.21 | 79.9 | 0.5 | 42.68 | 0.40 | 29.1 | 2.5 |
| 21 | 5.65 | 0.40 | 15.8 | 1.8 | 57.80 | 0.24 | 79.4 | 0.7 | 43.08 | 0.48 | 26.6 | 2.0 |
| 31 | 6.05 | 0.44 | 14.0 | 1.3 | 58.04 | 0.26 | 78.7 | 1.0 | 43.56 | 0.58 | 24.6 | 1.6 |
| April 10 | 6.49 | 0.48 | 12.7 | 0.7 | 58.30 | 0.29 | 77.7 | 1.2 | 44.14 | 0.62 | 23.0 | 1.0 |
| 20 | 6.97 | 0.52 | 12.0 | 0.0 | 58.59 | 0.29 | 76.5 | 1.4 | 44.76 | 0.65 | 22.0 | 0.4 |
| 30 | 7.49 | 0.52 | 12.0 | 0.6 | 58.88 | 0.30 | 75.1 | 1.5 | 45.41 | 0.68 | 21.6 | 0.3 |
| May 10 | 8.01 | 0.51 | 12.6 | 1.2 | 59.18 | 0.32 | 73.6 | 1.7 | 46.09 | 0.67 | 21.9 | 1.0 |
| 20 | 8.52 | 0.51 | 13.8 | 1.9 | 59.50 | 0.32 | 71.9 | 1.8 | 46.76 | 0.66 | 22.9 | 1.6 |
| 30 | 9.03 | 0.46 | 15.7 | 2.4 | 59.82 | 0.31 | 70.1 | 1.9 | 47.42 | 0.61 | 24.5 | 2.1 |
| June 9 | 9.49 | 0.42 | 18.1 | 2.7 | 60.13 | 0.30 | 68.2 | 1.8 | 48.03 | 0.54 | 26.6 | 2.6 |
| 19 | 9.91 | 0.37 | 20.8 | 3.1 | 60.43 | 0.27 | 66.4 | 1.7 | 48.57 | 0.48 | 29.2 | 3.1 |
| 29 | 10.28 | 0.29 | 23.9 | 3.5 | 60.70 | 0.25 | 64.7 | 1.6 | 49.05 | 0.39 | 32.3 | 3.4 |
| July 9 | 10.57 | 0.24 | 27.4 | 3.7 | 60.95 | 0.21 | 63.1 | 1.4 | 49.44 | 0.30 | 35.7 | 3.6 |
| 19 | 10.81 | 0.16 | 31.1 | 3.7 | 61.16 | 0.17 | 61.7 | 1.2 | 49.74 | 0.19 | 39.3 | 3.7 |
| 29 | 10.97 | 0.07 | 34.8 | 3.8 | 61.33 | 0.12 | 60.5 | 1.1 | 49.93 | 0.09 | 43.0 | 3.8 |
| Aug. 8 | 11.04 | 0.01 | 38.6 | 3.6 | 61.45 | 0.08 | 59.4 | 0.8 | 50.02 | 0.02 | 46.8 | 3.8 |
| 18 | 11.03 | 0.09 | 42.2 | 3.5 | 61.53 | 0.03 | 58.6 | 0.5 | 50.00 | 0.12 | 50.6 | 3.7 |
| 28 | 10.94 | 0.18 | 45.7 | 3.2 | 61.56 | 0.00 | 58.1 | 0.4 | 49.88 | 0.22 | 54.3 | 3.5 |
| Sept. 7 | 10.76 | 0.23 | 48.9 | 3.0 | 61.56 | 0.05 | 57.7 | 0.2 | 49.66 | 0.32 | 57.8 | 3.2 |
| 17 | 10.53 | 0.30 | 51.9 | 2.7 | 61.51 | 0.08 | 57.5 | 0.0 | 49.34 | 0.41 | 61.0 | 2.9 |
| 27 | 10.23 | 0.34 | 54.6 | 2.1 | 61.43 | 0.10 | 57.5 | 0.1 | 48.93 | 0.47 | 63.9 | 2.4 |
| Oct. 7 | 9.89 | 0.38 | 56.7 | 1.7 | 61.33 | 0.11 | 57.6 | 0.2 | 48.46 | 0.52 | 66.3 | 2.0 |
| 17 | 9.51 | 0.41 | 58.4 | 1.3 | 61.22 | 0.13 | 57.8 | 0.4 | 47.94 | 0.57 | 68.3 | 1.5 |
| 27 | 9.10 | 0.42 | 59.7 | 0.7 | 61.09 | 0.14 | 58.2 | 0.4 | 47.37 | 0.60 | 69.8 | 1.0 |
| Nov. 6 | 8.68 | 0.43 | 60.4 | 0.1 | 60.95 | 0.13 | 58.6 | 0.5 | 46.77 | 0.62 | 70.8 | 0.6 |
| 16 | 8.25 | 0.42 | 60.5 | 0.4 | 60.82 | 0.11 | 59.1 | 0.5 | 46.15 | 0.61 | 71.4 | 0.1 |
| 26 | 7.83 | 0.38 | 60.1 | 0.9 | 60.71 | 0.10 | 59.6 | 0.6 | 45.54 | 0.59 | 71.3 | 0.7 |
| Dec. 6 | 7.45 | 0.36 | 59.2 | 1.5 | 60.61 | 0.07 | 60.2 | 0.6 | 44.95 | 0.52 | 70.6 | 1.2 |
| 16 | 7.09 | 0.30 | 57.7 | 1.9 | 60.54 | 0.04 | 60.8 | 0.5 | 44.43 | 0.47 | 69.4 | 1.7 |
| 26 | 6.79 | 0.24 | 55.8 | 2.3 | 60.50 | 0.02 | 61.3 | 0.6 | 43.96 | 0.41 | 67.7 | 2.2 |
| 36 | 6.55 | | 53.5 | | 60.48 | | 61.9 | | 43.55 | | 65.5 | |

**Note.** — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon ;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | ε Pegasi. | | | | α AQUARII. | | | | α Gruis. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *South.* | |
| | h. 21 | m. 37 | ° 9 | ′ 12 | h. 21 | m. 58 | ° 1 | ′ 0 | h. 21 | m. 59 | ° 47 | ′ 39 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 5.27 | 0.03 | 54.4 | 1.2 | 21.75 | 0.04 | 71.9 | 0.7 | 6.79 | 0.07 | 39.3 | 1.4 |
| 11 | 5.24 | 0.01 | 53.2 | 1.2 | 21.71 | 0.01 | 72.6 | 0.7 | 6.72 | 0.02 | 37.9 | 1.7 |
| 21 | 5.25 | 0.04 | 52.0 | 1.2 | 21.72 | 0.02 | 73.3 | 0.7 | 6.70 | 0.02 | 36.2 | 1.9 |
| 31 | 5.29 | 0.06 | 50.8 | 1.2 | 21.74 | 0.05 | 74.0 | 0.5 | 6.72 | 0.06 | 34.3 | 2.2 |
| Feb. 10 | 5.35 | 0.09 | 49.6 | 1.1 | 21.79 | 0.08 | 74.5 | 0.4 | 6.78 | 0.12 | 32.1 | 2.3 |
| 20 | 5.44 | 0.13 | 48.5 | 0.8 | 21.87 | 0.12 | 74.9 | 0.2 | 6.90 | 0.16 | 29.8 | 2.5 |
| March 1 | 5.57 | 0.16 | 47.7 | 0.5 | 21.99 | 0.15 | 75.1 | 0.1 | 7.06 | 0.20 | 27.3 | 2.6 |
| 11 | 5.73 | 0.20 | 47.2 | 0.3 | 22.14 | 0.17 | 75.0 | 0.2 | 7.26 | 0.24 | 24.7 | 2.6 |
| 21 | 5.93 | 0.23 | 46.9 | 0.0 | 22.31 | 0.21 | 74.8 | 0.5 | 7.50 | 0.29 | 22.1 | 2.5 |
| 31 | 6.16 | 0.24 | 46.9 | 0.3 | 22.52 | 0.24 | 74.3 | 0.8 | 7.79 | 0.32 | 19.6 | 2.4 |
| April 10 | 6.40 | 0.27 | 47.2 | 0.7 | 22.76 | 0.26 | 73.5 | 1.1 | 8.11 | 0.36 | 17.2 | 2.4 |
| 20 | 6.67 | 0.29 | 47.9 | 1.1 | 23.02 | 0.29 | 72.4 | 1.4 | 8.47 | 0.39 | 14.8 | 2.3 |
| 30 | 6.96 | 0.30 | 49.0 | 1.4 | 23.31 | 0.30 | 71.0 | 1.6 | 8.86 | 0.41 | 12.5 | 2.1 |
| May 10 | 7.26 | 0.31 | 50.4 | 1.7 | 23.61 | 0.32 | 69.4 | 1.7 | 9.27 | 0.43 | 10.4 | 1.8 |
| 20 | 7.57 | 0.32 | 52.1 | 1.9 | 23.93 | 0.32 | 67.7 | 1.9 | 9.70 | 0.44 | 8.6 | 1.5 |
| 30 | 7.89 | 0.31 | 54.0 | 2.1 | 24.25 | 0.32 | 65.8 | 2.0 | 10.14 | 0.44 | 7.1 | 1.1 |
| June 9 | 8.20 | 0.30 | 56.1 | 2.3 | 24.57 | 0.30 | 63.8 | 2.0 | 10.58 | 0.43 | 6.0 | 0.7 |
| 19 | 8.50 | 0.27 | 58.4 | 2.3 | 24.87 | 0.30 | 61.8 | 2.0 | 11.01 | 0.40 | 5.3 | 0.2 |
| 29 | 8.77 | 0.24 | 60.7 | 2.3 | 25.17 | 0.27 | 59.8 | 1.9 | 11.41 | 0.37 | 5.1 | 0.2 |
| July 9 | 9.01 | 0.22 | 63.0 | 2.2 | 25.44 | 0.23 | 57.9 | 1.8 | 11.78 | 0.32 | 5.3 | 0.5 |
| 19 | 9.23 | 0.17 | 65.2 | 2.1 | 25.67 | 0.19 | 56.1 | 1.6 | 12.10 | 0.28 | 5.8 | 0.9 |
| 29 | 9.40 | 0.13 | 67.3 | 1.9 | 25.86 | 0.15 | 54.5 | 1.4 | 12.38 | 0.22 | 6.7 | 1.3 |
| Aug. 8 | 9.53 | 0.09 | 69.2 | 1.7 | 26.01 | 0.11 | 53.1 | 1.2 | 12.60 | 0.15 | 8.0 | 1.5 |
| 18 | 9.62 | 0.03 | 70.9 | 1.5 | 26.12 | 0.06 | 51.9 | 1.0 | 12.75 | 0.10 | 9.5 | 1.7 |
| 28 | 9.65 | 0.01 | 72.4 | 1.3 | 26.18 | 0.01 | 50.9 | 0.7 | 12.85 | 0.03 | 11.2 | 1.8 |
| Sept. 7 | 9.66 | 0.04 | 73.7 | 1.0 | 26.19 | 0.02 | 50.2 | 0.4 | 12.88 | 0.02 | 13.0 | 2.0 |
| 17 | 9.62 | 0.08 | 74.7 | 0.8 | 26.17 | 0.07 | 49.8 | 0.3 | 12.86 | 0.09 | 15.0 | 1.9 |
| 27 | 9.54 | 0.10 | 75.5 | 0.5 | 26.10 | 0.08 | 49.5 | 0.1 | 12.77 | 0.14 | 16.9 | 1.7 |
| Oct. 7 | 9.44 | 0.12 | 76.0 | 0.3 | 26.02 | 0.10 | 49.4 | 0.0 | 12.63 | 0.18 | 18.6 | 1.5 |
| 17 | 9.32 | 0.13 | 76.3 | 0.0 | 25.92 | 0.12 | 49.4 | 0.2 | 12.45 | 0.19 | 20.1 | 1.3 |
| 27 | 9.19 | 0.13 | 76.3 | 0.1 | 25.80 | 0.13 | 49.6 | 0.3 | 12.26 | 0.21 | 21.4 | 1.0 |
| Nov. 6 | 9.06 | 0.13 | 76.2 | 0.4 | 25.67 | 0.12 | 49.9 | 0.4 | 12.05 | 0.21 | 22.4 | 0.6 |
| 16 | 8.93 | 0.12 | 75.8 | 0.6 | 25.55 | 0.11 | 50.3 | 0.5 | 11.84 | 0.21 | 23.0 | 0.0 |
| 26 | 8.81 | 0.10 | 75.2 | 0.7 | 25.44 | 0.11 | 50.8 | 0.7 | 11.63 | 0.19 | 23.0 | 0.1 |
| Dec. 6 | 8.71 | 0.09 | 74.5 | 0.9 | 25.33 | 0.09 | 51.5 | 0.7 | 11.44 | 0.15 | 22.9 | 0.5 |
| 16 | 8.62 | 0.07 | 73.6 | 1.1 | 25.24 | 0.07 | 52.2 | 0.6 | 11.29 | 0.14 | 22.4 | 0.8 |
| 26 | 8.55 | 0.05 | 72.5 | 1.1 | 25.17 | 0.04 | 52.8 | 0.7 | 11.15 | 0.09 | 21.6 | 1.2 |
| 36 | 8.50 | | 71.4 | | 25.13 | | 53.5 | | 11.06 | | 20.4 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | ζ Pegasi. | | | | α Piscis Australis. (*Fomalhaut.*) | | | | α Pegasi. (*Markab.*) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *South.* | | Right Ascension. | | Dec. *North.* | |
| | h. m. 22 34 | | ° ′ 10 4 | | h. m. 22 49 | | ° ′ 30 22 | | h. m. 22 57 | | ° ′ 14 25 | |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 15.44 | 0.06 | 47.6 | 1.1 | 40.04 | 0.08 | 79.5 | 0.4 | 34.19 | 0.08 | 51.1 | 1.1 |
| 11 | 15.38 | 0.05 | 46.5 | 1.1 | 39.96 | 0.05 | 79.1 | 0.7 | 34.11 | 0.06 | 50.0 | 1.1 |
| 21 | 15.33 | 0.01 | 45.4 | 1.0 | 39.91 | 0.03 | 78.4 | 1.0 | 34.05 | 0.04 | 48.9 | 1.2 |
| 31 | 15.32 | 0.00 | 44.4 | 1.0 | 39.88 | 0.00 | 77.4 | 1.2 | 34.01 | 0.01 | 47.7 | 1.2 |
| Feb. 10 | 15.32 | 0.03 | 43.4 | 0.9 | 39.88 | 0.04 | 76.2 | 1.4 | 34.00 | 0.01 | 46.5 | 1.2 |
| 20 | 15.35 | 0.07 | 42.5 | 0.8 | 39.92 | 0.06 | 74.8 | 1.7 | 34.01 | 0.05 | 45.3 | 1.0 |
| March 1 | 15.42 | 0.11 | 41.7 | 0.6 | 39.98 | 0.12 | 73.1 | 1.8 | 34.06 | 0.08 | 44.3 | 0.7 |
| 11 | 15.53 | 0.14 | 41.1 | 0.4 | 40.10 | 0.14 | 71.3 | 2.0 | 34.14 | 0.11 | 43.6 | 0.6 |
| 21 | 15.67 | 0.17 | 40.7 | 0.0 | 40.24 | 0.18 | 69.3 | 2.1 | 34.25 | 0.15 | 43.0 | 0.3 |
| 31 | 15.84 | 0.20 | 40.7 | 0.2 | 40.42 | 0.22 | 67.2 | 2.3 | 34.40 | 0.19 | 42.7 | 0.0 |
| April 10 | 16.04 | 0.24 | 40.9 | 0.6 | 40.64 | 0.25 | 64.9 | 2.3 | 34.59 | 0.23 | 42.7 | 0.4 |
| 20 | 16.28 | 0.26 | 41.5 | 1.0 | 40.89 | 0.28 | 62.6 | 2.4 | 34.82 | 0.25 | 43.1 | 0.7 |
| 30 | 16.54 | 0.29 | 42.5 | 1.3 | 41.17 | 0.31 | 60.2 | 2.3 | 35.07 | 0.28 | 43.8 | 1.1 |
| May 10 | 16.83 | 0.31 | 43.8 | 1.6 | 41.48 | 0.34 | 57.9 | 2.2 | 35.35 | 0.31 | 44.9 | 1.4 |
| 20 | 17.14 | 0.32 | 45.4 | 1.8 | 41.82 | 0.36 | 55.7 | 2.1 | 35.66 | 0.32 | 46.3 | 1.7 |
| 30 | 17.46 | 0.32 | 47.2 | 2.0 | 42.18 | 0.36 | 53.6 | 1.9 | 35.98 | 0.32 | 48.0 | 2.0 |
| June 9 | 17.78 | 0.31 | 49.2 | 2.2 | 42.54 | 0.35 | 51.7 | 1.7 | 36.30 | 0.32 | 50.0 | 2.2 |
| 19 | 18.09 | 0.30 | 51.4 | 2.3 | 42.89 | 0.35 | 50.0 | 1.3 | 36.62 | 0.32 | 52.2 | 2.4 |
| 29 | 18.39 | 0.29 | 53.7 | 2.4 | 43.24 | 0.33 | 48.7 | 1.0 | 36.94 | 0.30 | 54.6 | 2.4 |
| July 9 | 18.68 | 0.27 | 56.1 | 2.3 | 43.57 | 0.31 | 47.7 | 0.7 | 37.24 | 0.28 | 57.0 | 2.4 |
| 19 | 18.95 | 0.21 | 58.4 | 2.2 | 43.88 | 0.27 | 47.0 | 0.2 | 37.52 | 0.23 | 59.4 | 2.4 |
| 29 | 19.16 | 0.18 | 60.6 | 2.0 | 44.15 | 0.23 | 46.8 | 0.0 | 37.75 | 0.19 | 61.8 | 2.2 |
| Aug. 8 | 19.34 | 0.15 | 62.6 | 1.9 | 44.38 | 0.19 | 46.8 | 0.4 | 37.94 | 0.17 | 64.0 | 2.1 |
| 18 | 19.49 | 0.10 | 64.5 | 1.7 | 44.57 | 0.13 | 47.2 | 0.8 | 38.11 | 0.12 | 66.1 | 1.9 |
| 28 | 19.59 | 0.06 | 66.2 | 1.4 | 44.70 | 0.10 | 48.0 | 1.0 | 38.23 | 0.08 | 68.0 | 1.7 |
| Sept. 7 | 19.65 | 0.01 | 67.6 | 1.2 | 44.80 | 0.03 | 49.0 | 1.1 | 38.31 | 0.04 | 69.7 | 1.5 |
| 17 | 19.66 | 0.01 | 68.8 | 0.9 | 44.83 | 0.02 | 50.1 | 1.3 | 38.35 | 0.01 | 71.2 | 1.2 |
| 27 | 19.65 | 0.04 | 69.7 | 0.7 | 44.82 | 0.04 | 51.4 | 1.4 | 38.34 | 0.03 | 72.4 | 1.0 |
| Oct. 7 | 19.61 | 0.08 | 70.4 | 0.5 | 44.77 | 0.07 | 52.8 | 1.3 | 38.31 | 0.06 | 73.4 | 0.7 |
| 17 | 19.53 | 0.10 | 70.9 | 0.2 | 44.70 | 0.10 | 54.1 | 1.3 | 38.25 | 0.07 | 74.1 | 0.5 |
| 27 | 19.43 | 0.11 | 71.1 | 0.1 | 44.60 | 0.13 | 55.4 | 1.1 | 38.18 | 0.10 | 74.6 | 0.2 |
| Nov. 6 | 19.32 | 0.11 | 71.0 | 0.2 | 44.47 | 0.14 | 56.5 | 1.0 | 38.08 | 0.12 | 74.8 | 0.0 |
| 16 | 19.21 | 0.12 | 70.8 | 0.3 | 44.33 | 0.14 | 57.5 | 0.8 | 37.96 | 0.12 | 74.8 | 0.2 |
| 26 | 19.09 | 0.11 | 70.5 | 0.5 | 44.19 | 0.13 | 58.3 | 0.5 | 37.84 | 0.11 | 74.6 | 0.4 |
| Dec. 6 | 18.98 | 0.11 | 70.0 | 0.7 | 44.06 | 0.13 | 58.8 | 0.2 | 37.73 | 0.10 | 74.2 | 0.6 |
| 16 | 18.87 | 0.08 | 69.3 | 0.8 | 43.93 | 0.10 | 59.0 | 0.0 | 37.63 | 0.09 | 73.6 | 0.8 |
| 26 | 18.79 | 0.07 | 68.5 | 0.9 | 43.83 | 0.09 | 59.0 | 0.3 | 37.54 | 0.09 | 72.8 | 1.0 |
| 36 | 18.72 | | 67.6 | | 43.74 | | 58.7 | | 37.45 | | 71.8 | |

**Note.** — Before the 22d of March the Sidereal day of the Month begins at the Sidereal 0h. *after* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

| Sidereal Day of the Month. | ι Piscium. | | | | γ Cephei. | | | |
|---|---|---|---|---|---|---|---|---|
| | Right Ascension. | | Dec. *North.* | | Right Ascension. | | Dec. *North.* | |
| | h. 23 | m. 32 | ° 4 | ′ 50 | h. 23 | m. 33 | ° 76 | ′ 49 |
| | s. | s. | ″ | ″ | s. | s. | ″ | ″ |
| Jan. 1 | 31.78 | 0.08 | 42.6 | 0.7 | 24.10 | 0.84 | 58.5 | 0.9 |
| 11 | 31.70 | 0.07 | 41.9 | 0.8 | 23.26 | 0.79 | 57.6 | 1.3 |
| 21 | 31.63 | 0.06 | 41.1 | 0.7 | 22.47 | 0.68 | 56.3 | 1.8 |
| 31 | 31.57 | 0.03 | 40.4 | 0.6 | 21.79 | 0.56 | 54.5 | 2.3 |
| Feb. 10 | 31.54 | 0.02 | 39.8 | 0.5 | 21.23 | 0.40 | 52.2 | 2.6 |
| 20 | 31.52 | 0.00 | 39.3 | 0.5 | 20.83 | 0.29 | 49.6 | 3.0 |
| March 1 | 31.52 | 0.05 | 38.8 | 0.2 | 20.54 | 0.09 | 46.6 | 3.0 |
| 11 | 31.57 | 0.08 | 38.6 | 0.0 | 20.45 | 0.09 | 43.6 | 3.0 |
| 21 | 31.65 | 0.13 | 38.6 | 0.2 | 20.54 | 0.28 | 40.6 | 2.9 |
| 31 | 31.78 | 0.15 | 38.8 | 0.5 | 20.82 | 0.44 | 37.7 | 2.7 |
| April 10 | 31.93 | 0.19 | 39.3 | 0.8 | 21.26 | 0.59 | 35.0 | 2.3 |
| 20 | 32.12 | 0.23 | 40.1 | 1.1 | 21.85 | 0.71 | 32.7 | 1.9 |
| 30 | 32.35 | 0.26 | 41.2 | 1.4 | 22.56 | 0.84 | 30.8 | 1.4 |
| May 10 | 32.61 | 0.28 | 42.6 | 1.6 | 23.40 | 0.94 | 29.4 | 0.8 |
| 20 | 32.89 | 0.31 | 44.2 | 1.8 | 24.34 | 0.99 | 28.6 | 0.2 |
| 30 | 33.20 | 0.31 | 46.0 | 2.0 | 25.33 | 1.01 | 28.4 | 0.5 |
| June 9 | 33.51 | 0.32 | 48.0 | 2.1 | 26.34 | 1.01 | 28.9 | 1.1 |
| 19 | 33.83 | 0.32 | 50.1 | 2.2 | 27.35 | 0.97 | 30.0 | 1.5 |
| 29 | 34.15 | 0.31 | 52.3 | 2.2 | 28.32 | 0.92 | 31.5 | 2.0 |
| July 9 | 34.46 | 0.29 | 54.5 | 2.1 | 29.24 | 0.84 | 33.5 | 2.7 |
| 19 | 34.75 | 0.27 | 56.6 | 2.0 | 30.08 | 0.74 | 36.2 | 3.1 |
| 29 | 35.02 | 0.23 | 58.6 | 1.8 | 30.82 | 0.63 | 39.3 | 3.4 |
| Aug. 8 | 35.25 | 0.20 | 60.4 | 1.6 | 31.45 | 0.49 | 42.7 | 3.5 |
| 18 | 35.45 | 0.15 | 62.0 | 1.4 | 31.94 | 0.37 | 46.2 | 3.8 |
| 28 | 35.60 | 0.12 | 63.4 | 1.2 | 32.31 | 0.22 | 50.0 | 3.9 |
| Sept. 7 | 35.72 | 0.08 | 64.6 | 0.9 | 32.53 | 0.07 | 53.9 | 3.8 |
| 17 | 35.80 | 0.03 | 65.5 | 0.7 | 32.60 | 0.05 | 57.7 | 3.8 |
| 27 | 35.83 | 0.01 | 66.2 | 0.5 | 32.55 | 0.22 | 61.5 | 3.7 |
| Oct. 7 | 35.84 | 0.02 | 66.7 | 0.2 | 32.33 | 0.32 | 65.2 | 3.4 |
| 17 | 35.82 | 0.05 | 66.9 | 0.1 | 32.01 | 0.45 | 68.6 | 3.2 |
| 27 | 35.77 | 0.07 | 67.0 | 0.1 | 31.56 | 0.59 | 71.8 | 2.7 |
| Nov. 6 | 35.70 | 0.09 | 66.9 | 0.3 | 30.97 | 0.67 | 74.5 | 2.3 |
| 16 | 35.61 | 0.09 | 66.6 | 0.4 | 30.30 | 0.75 | 76.8 | 1.9 |
| 26 | 35.52 | 0.09 | 66.2 | 0.5 | 29.55 | 0.83 | 78.7 | 1.3 |
| Dec. 6 | 35.43 | 0.09 | 65.7 | 0.6 | 28.72 | 0.85 | 80.0 | 0.7 |
| 16 | 35.34 | 0.10 | 65.1 | 0.6 | 27.87 | 0.88 | 80.7 | 0.1 |
| 26 | 35.24 | 0.09 | 64.5 | 0.7 | 26.99 | 0.82 | 80.8 | 0.5 |
| 36 | 35.15 | | 63.8 | | 26.17 | | 80.3 | |

after the 22d of March it begins at the Sidereal 0h. *before* the Mean Noon.

## TABLE GIVING THE CORRECTION OF THREE OF THE POLAR STARS FOR TERMS OF NUTATION INVOLVING 2 ☾.

| ☽ or ☽—180°. | 51 Cephei. | | σ Octanis. | | λ Urs. Min. | | ☽ or ☽—180°. |
|---|---|---|---|---|---|---|---|
| | R.A. | Dec. | R.A. | Dec. | R.A. | Dec. | |
| ° | s. | ″ | s. | ″ | s. | ″ | ° |
| 0 | +.018 | +.09 | —.025 | —.09 | —.159 | —.08 | 90 |
| 1 | .014 | .09 | .040 | .09 | .151 | .08 | 91 |
| 2 | .009 | .09 | .055 | .09 | .143 | .08 | 92 |
| 3 | .005 | .09 | .070 | .09 | .135 | .08 | 93 |
| 4 | +.001 | .09 | .085 | .09 | .127 | .08 | 94 |
| 5 | —.003 | +.09 | —.100 | —.09 | —.118 | —.08 | 95 |
| 6 | .008 | .09 | .115 | .08 | .109 | .08 | 96 |
| 7 | .012 | .09 | .130 | .08 | .100 | .08 | 97 |
| 8 | .017 | .09 | .144 | .08 | .091 | .08 | 98 |
| 9 | .021 | .09 | .158 | .08 | .082 | .08 | 99 |
| 10 | —.025 | +.09 | —.172 | —.08 | —.073 | —.09 | 100 |
| 11 | .029 | .09 | .186 | .08 | .064 | .09 | 101 |
| 12 | .033 | .09 | .200 | .08 | .055 | .09 | 102 |
| 13 | .037 | .08 | .213 | .08 | .046 | .09 | 103 |
| 14 | .041 | .08 | .226 | .08 | .036 | .09 | 104 |
| 15 | —.045 | +.08 | —.239 | —.08 | —.026 | —.09 | 105 |
| 16 | .049 | .08 | .251 | .07 | .017 | .09 | 106 |
| 17 | .053 | .08 | .263 | .07 | —.008 | .09 | 107 |
| 18 | .056 | .08 | .275 | .07 | +.002 | .09 | 108 |
| 19 | .060 | .08 | .287 | .07 | .012 | .09 | 109 |
| 20 | —.065 | +.08 | —.299 | —.07 | +.022 | —.09 | 110 |
| 21 | .069 | .07 | .310 | .07 | .032 | .09 | 111 |
| 22 | .073 | .07 | .320 | .06 | .041 | .09 | 112 |
| 23 | .076 | .07 | .330 | .06 | .050 | .08 | 113 |
| 24 | .079 | .07 | .340 | .06 | .060 | .08 | 114 |
| 25 | —.082 | +.07 | —.350 | —.06 | +.070 | —.08 | 115 |
| 26 | .085 | .06 | .359 | .05 | .079 | .08 | 116 |
| 27 | .088 | .06 | .368 | .05 | .088 | .08 | 117 |
| 28 | .091 | .06 | .376 | .05 | .097 | .08 | 118 |
| 29 | .094 | .05 | .383 | .04 | .106 | .08 | 119 |
| 30 | —.097 | +.05 | —.390 | —.04 | +.115 | —.08 | 120 |
| 31 | .100 | .05 | .396 | .04 | .124 | .08 | 121 |
| 32 | .103 | .05 | .402 | .03 | .133 | .08 | 122 |
| 33 | .105 | .04 | .408 | .03 | .142 | .07 | 123 |
| 34 | .107 | .04 | .413 | .03 | .150 | .07 | 124 |
| 35 | —.109 | +.04 | —.418 | —.02 | +.158 | —.07 | 125 |
| 36 | .111 | .04 | .423 | .02 | .165 | .07 | 126 |
| 37 | .113 | .03 | .427 | .02 | .172 | .06 | 127 |
| 38 | .115 | .03 | .430 | —.01 | .179 | .06 | 128 |
| 39 | .116 | .03 | .432 | +.01 | .186 | .06 | 129 |
| 40 | —.117 | +.03 | —.434 | +.01 | +.193 | —.06 | 130 |
| 41 | .118 | .02 | .435 | .00 | .199 | .05 | 131 |
| 42 | .119 | .02 | .436 | .00 | .206 | .05 | 132 |
| 43 | .120 | .01 | .436 | .00 | .212 | .05 | 133 |
| 44 | .121 | .01 | .436 | .00 | .218 | .05 | 134 |
| 45 | .122 | .01 | .436 | +.01 | +.224 | —.04 | 135 |

| ☽ or ☽—180°. | 51 Cephei. | | σ Octanis. | | λ Urs. Min. | | ☽ or ☽—180°. |
|---|---|---|---|---|---|---|---|
| | R.A. | Dec. | R.A. | Dec. | R.A. | Dec. | |
| ° | s. | ″ | s. | ″ | s. | ″ | ° |
| 45 | —.122 | +.01 | —.436 | +.01 | +.224 | —.04 | 135 |
| 46 | .123 | .00 | .435 | .01 | .229 | .04 | 136 |
| 47 | .124 | .00 | .433 | .02 | .234 | .04 | 137 |
| 48 | .124 | +.00 | .431 | .02 | .239 | .04 | 138 |
| 49 | .124 | —.01 | .428 | .02 | .244 | .04 | 139 |
| 50 | —.124 | —.01 | —.425 | +.02 | +.249 | —.03 | 140 |
| 51 | .123 | .01 | .421 | .03 | .253 | .03 | 141 |
| 52 | .123 | .02 | .417 | .03 | .256 | .03 | 142 |
| 53 | .122 | .02 | .412 | .03 | .259 | .02 | 143 |
| 54 | .122 | .02 | .407 | .04 | .252 | .02 | 144 |
| 55 | —.121 | —.02 | —.401 | +.04 | +.255 | —.02 | 145 |
| 56 | .121 | .03 | .395 | .04 | .267 | .02 | 146 |
| 57 | .120 | .03 | .389 | .04 | .269 | .01 | 147 |
| 58 | .119 | .03 | .382 | .05 | .271 | .01 | 148 |
| 59 | .117 | .04 | .374 | .05 | .273 | —.01 | 149 |
| 60 | —.115 | —.04 | —.365 | +.05 | +.274 | +.00 | 150 |
| 61 | .114 | .04 | .356 | .05 | .275 | .00 | 151 |
| 62 | .112 | .04 | .347 | .06 | .275 | .00 | 152 |
| 63 | .110 | .05 | .338 | .06 | .275 | .01 | 153 |
| 64 | .108 | .05 | .328 | .06 | .275 | .01 | 154 |
| 65 | —.106 | —.05 | —.318 | +.06 | +.275 | +.01 | 155 |
| 66 | .102 | .06 | .307 | .07 | .274 | .02 | 156 |
| 67 | .100 | .06 | .296 | .07 | .272 | .02 | 157 |
| 68 | .098 | .06 | .284 | .07 | .270 | .02 | 158 |
| 69 | .095 | .06 | .272 | .07 | .268 | .02 | 159 |
| 70 | —.093 | —.06 | —.261 | +.07 | +.266 | +.03 | 160 |
| 71 | .090 | .07 | .249 | .08 | .263 | .03 | 161 |
| 72 | .087 | .07 | .237 | .08 | .260 | .03 | 162 |
| 73 | .084 | .07 | .224 | .08 | .257 | .04 | 163 |
| 74 | .080 | .07 | .211 | .08 | .254 | .04 | 164 |
| 75 | —.077 | —.07 | —.197 | +.08 | +.250 | +.04 | 165 |
| 76 | .074 | .08 | .183 | .09 | .246 | .04 | 166 |
| 77 | .070 | .08 | .169 | .09 | .242 | .05 | 167 |
| 78 | .066 | .08 | .155 | .09 | .237 | .05 | 168 |
| 79 | .062 | .08 | .141 | .09 | .232 | .05 | 169 |
| 80 | —.059 | —.08 | —.126 | +.09 | +.227 | +.06 | 170 |
| 81 | .055 | .08 | .111 | .09 | .221 | .06 | 171 |
| 82 | .050 | .08 | .096 | .09 | .215 | .06 | 172 |
| 83 | .047 | .09 | .081 | .09 | .209 | .06 | 173 |
| 84 | .043 | .09 | .066 | .09 | .203 | .06 | 174 |
| 85 | —.039 | —.09 | —.051 | +.09 | +.196 | +.07 | 175 |
| 86 | .035 | .09 | .036 | .09 | .189 | .07 | 176 |
| 87 | .030 | .09 | .021 | .09 | .182 | .07 | 177 |
| 88 | .026 | .09 | —.006 | .09 | .175 | .07 | 178 |
| 89 | .022 | .09 | +.009 | .09 | .167 | .07 | 179 |
| 90 | —.018 | —.09 | +.025 | +.09 | +.159 | +.08 | 180 |

NOTE. — When the Argument is on the right-hand side of the Table, the sign of the correction is to be reversed.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. | | APPARENT DECLINATION. | | HOURLY MOTION. | | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Noon. | Apparent Noon. | Mean Noon. | Apparent Noon. | Right Ascension. | Declination. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| Jan. 1 | 18 45 52.82 | 53.48 | −23 2 25.5 | 24.9 | 11.045 | 12.11 | + 3 42.11 | 16 18.42 | 1 11.10 | 18 42 10.83 |
| 2 | 18 50 17.86 | 18.63 | 22 57 21.3 | 20.5 | 11.032 | 13.23 | 4 10.53 | 18.41 | 11.05 | 18 46 7.40 |
| 3 | 18 54 42.43 | 43.29 | 22 51 49.6 | 48.6 | 11.017 | 14.38 | 4 38.54 | 18.40 | 11.00 | 18 50 3.96 |
| 4 | 18 59 6.66 | 7.60 | 22 45 50.5 | 49.3 | 11.001 | 15.51 | 5 6.22 | 18.38 | 10.95 | 18 54 0.52 |
| 5 | 19 3 30.50 | 31.52 | 22 39 24.3 | 22.9 | 10.984 | 16.65 | 5 33.51 | 18.36 | 10.89 | 18 57 57.08 |
| 6 | 19 7 53.90 | 55.00 | 22 32 31.2 | 29.6 | 10.965 | 17.76 | 6 0.36 | 18.34 | 10.83 | 19 1 53.64 |
| 7 | 19 12 16.84 | 18.01 | 22 25 11.3 | 9.4 | 10.946 | 18.86 | 6 26.73 | 18.31 | 10.77 | 19 5 50.20 |
| 8 | 19 16 39.29 | 40.54 | 22 17 24.9 | 22.8 | 10.926 | 19.96 | 6 52.63 | 18.28 | 10.70 | 19 9 46.75 |
| 9 | 19 21 1.20 | 2.53 | 22 9 12.1 | 9.7 | 10.903 | 21.05 | 7 17.99 | 18.24 | 10.63 | 19 13 43.31 |
| 10 | 19 25 22.57 | 23.97 | 22 0 33.3 | 30.5 | 10.878 | 22.13 | 7 42.79 | 18.20 | 10.56 | 19 17 39.88 |
| 11 | 19 29 43.33 | 44.79 | 21 51 28.7 | 25.6 | 10.853 | 23.21 | 8 7.02 | 18.16 | 10.47 | 19 21 36.43 |
| 12 | 19 34 3.50 | 5.02 | 21 41 58.7 | 55.3 | 10.828 | 24.26 | 8 30.63 | 18.11 | 10.39 | 19 25 32.99 |
| 13 | 19 38 23.05 | 24.64 | 21 31 63.4 | :59.7 | 10.803 | 25.30 | 8 53.63 | 18.06 | 10.30 | 19 29 29.55 |
| 14 | 19 42 41.94 | 43.60 | 21 21 43.2 | 39.2 | 10.774 | 26.33 | 9 15.98 | 18.01 | 10.20 | 19 33 26.10 |
| 15 | 19 47 0.16 | 1.88 | 21 10 58.3 | 54.0 | 10.745 | 27.36 | 9 37.65 | 17.95 | 10.11 | 19 37 22.66 |
| 16 | 19 51 17.69 | 19.47 | 20 59 49.3 | 44.7 | 10.716 | 28.36 | 9 58.62 | 17.88 | 10.02 | 19 41 19.22 |
| 17 | 19 55 34.51 | 36.34 | 20 48 16.0 | 11.0 | 10.687 | 29.36 | 10 18.88 | 17.81 | 9.92 | 19 45 15.78 |
| 18 | 19 59 50.59 | 52.47 | 20 36 19.3 | 14.0 | 10.657 | 30.32 | 10 38.40 | 17.73 | 9.83 | 19 49 12.34 |
| 19 | 20 4 5.94 | 7.87 | 20 23 59.2 | 53.5 | 10.626 | 31.29 | 10 57.18 | 17.64 | 9.73 | 19 53 8.89 |
| 20 | 20 8 20.54 | 22.52 | 20 11 16.3 | 10.3 | 10.595 | 32.23 | 11 15.20 | 17.55 | 9.63 | 19 57 5.46 |
| 21 | 20 12 34.38 | 36.40 | 19 58 10.7 | 4.4 | 10.562 | 33.18 | 11 32.50 | 17.45 | 9.53 | 20 1 2.01 |
| 22 | 20 16 47.46 | 49.52 | 19 44 42.8 | 36.1 | 10.530 | 34.09 | 11 49.02 | 17.36 | 9.43 | 20 4 58.57 |
| 23 | 20 20 59.77 | :61.87 | 19 30 52.8 | 45.8 | 10.498 | 35.00 | 12 4.75 | 17.24 | 9.32 | 20 8 55.13 |
| 24 | 20 25 11.29 | 13.43 | 19 16 41.3 | 34.0 | 10.465 | 35.88 | 12 19.72 | 17.12 | 9.22 | 20 12 51.68 |
| 25 | 20 29 22.03 | 24.21 | 19 2 8.4 | 0.8 | 10.432 | 36.78 | 12 33.90 | 17.01 | 9.10 | 20 16 48.24 |
| 26 | 20 33 31.98 | 34.19 | 18 47 14.8 | 6.9 | 10.399 | 37.64 | 12 47.28 | 16.88 | 8.99 | 20 20 44.80 |
| 27 | 20 37 41.15 | 43.38 | 18 31 60.6 | 52.3 | 10.366 | 38.50 | 12 59.90 | 16.76 | 8.88 | 20 24 41.35 |
| 28 | 20 41 49.53 | 51.79 | 18 16 26.2 | 17.6 | 10.333 | 39.33 | 13 11.72 | 16.63 | 8.77 | 20 28 37.91 |
| 29 | 20 45 57.11 | 59.40 | 18 0 32.0 | 23.1 | 10.300 | 40.15 | 13 22.72 | 16.49 | 8.64 | 20 32 34.47 |
| 30 | 20 50 3.89 | 6.20 | 17 44 18.6 | 9.4 | 10.267 | 40.94 | 13 32.94 | 16.34 | 8.53 | 20 36 31.02 |
| 31 | 20 54 9.87 | 12.19 | 17 27 46.0 | 36.6 | 10.233 | 41.73 | 13 42.35 | 16.19 | 8.41 | 20 40 27.58 |
| Feb. 1 | 20 58 15.04 | 17.38 | 17 10 54.8 | 45.1 | 10.200 | 42.49 | 13 50.95 | 16.04 | 8.30 | 20 44 24.14 |
| 2 | 21 2 19.40 | 21.75 | 16 53 45.5 | 35.5 | 10.166 | 43.25 | 13 58.76 | 15.89 | 8.19 | 20 48 20.69 |
| 3 | 21 6 22.95 | 25.32 | 16 36 18.5 | 8.3 | 10.133 | 43.98 | 14 5.74 | 15.73 | 8.07 | 20 52 17.25 |
| 4 | 21 10 25.68 | 28.06 | 16 18 33.8 | 23.3 | 10.099 | 44.71 | 14 11.90 | 15.57 | 7.95 | 20 56 13.81 |
| 5 | 21 14 27.60 | 29.98 | 16 0 32.3 | 21.6 | 10.065 | 45.39 | 14 17.27 | 15.42 | 7.84 | 21 0 10.36 |
| 6 | 21 18 28.71 | 31.09 | 15 42 14.3 | 3.4 | 10.030 | 46.08 | 14 21.82 | 15.24 | 7.72 | 21 4 6.92 |
| 7 | 21 22 29.01 | 31.39 | 15 23 40.2 | 29.1 | 9.997 | 46.74 | 14 25.56 | 15.07 | 7.61 | 21 8 3.47 |
| 8 | 21 26 28.49 | 30.88 | 15 4 50.3 | 39.0 | 9.963 | 47.39 | 14 28.47 | 14.88 | 7.50 | 21 12 0.03 |
| 9 | 21 30 27.16 | 29.55 | 14 45 45.4 | 33.9 | 9.930 | 48.01 | 14 30.58 | 14.71 | 7.39 | 21 15 56.59 |
| 10 | 21 34 25.04 | 27.42 | 14 26 25.5 | 13.9 | 9.896 | 48.62 | 14 31.91 | 14.53 | 7.28 | 21 19 53.15 |
| 11 | 21 38 22.13 | 24.50 | 14 6 51.2 | 39.4 | 9.862 | 49.20 | 14 32.44 | 14.35 | 7.17 | 21 23 49.70 |
| 12 | 21 42 18.42 | 20.79 | 13 46 63.1 | :51.2 | 9.828 | 49.77 | 14 32.16 | 14.16 | 7.06 | 21 27 46.26 |
| 13 | 21 46 13.91 | 16.27 | 13 26 61.5 | :49.4 | 9.695 | 50.32 | 14 31.08 | 13.97 | 6.95 | 21 31 42.81 |
| 14 | 21 50 8.63 | 10.98 | 13 6 46.9 | 34.7 | 9.766 | 50.86 | 14 29.21 | 13.78 | 6.84 | 21 35 39.37 |
| 15 | 21 54 2.59 | 4.93 | 12 46 19.7 | 7.5 | 9.734 | 51.37 | 14 26.63 | 13.59 | 6.73 | 21 39 35.92 |
| 16 | 21 57 55.81 | 58.13 | 12 25 40.2 | 27.9 | 9.703 | 51.88 | 14 23.28 | 13.39 | 6.63 | 21 43 32.48 |
| 17 | 22 1 48.30 | 50.60 | 12 4 49.1 | 36.7 | 9.671 | 52.36 | 14 19.21 | 13.19 | 6.53 | 21 47 29.03 |
| 18 | 22 5 40.06 | 42.34 | 11 43 46.5 | 34.0 | 9.642 | 52.83 | 14 14.40 | 12.98 | 6.44 | 21 51 25.59 |
| 19 | 22 9 31.13 | 33.39 | 11 22 33.0 | 20.4 | 9.614 | 53.26 | 14 8.92 | 12.77 | 6.34 | 21 55 22.14 |
| 20 | 22 13 21.52 | 23.76 | 11 0 68.7 | :56.1 | 9.587 | 53.71 | 14 2.75 | 12.55 | 6.24 | 21 59 18.70 |
| 21 | 22 17 11.25 | 13.45 | 10 39 34.3 | 21.8 | 9.559 | 54.12 | 13 55.93 | 12.34 | 6.14 | 22 3 15.25 |
| 22 | 22 21 0.33 | 2.51 | 10 17 50.0 | 37.5 | 9.532 | 54.52 | 13 48.43 | 12.10 | 6.04 | 22 7 11.81 |
| 23 | 22 24 48.77 | 50.92 | 9 55 56.1 | 43.6 | 9.507 | 54.90 | 13 40.34 | 11.86 | 5.95 | 22 11 8.36 |
| 24 | 22 28 36.60 | 38.73 | 9 33 53.4 | 40.9 | 9.482 | 55.29 | 13 31.61 | 11.63 | 5.85 | 22 15 4.91 |
| 25 | 22 32 23.86 | 25.96 | 9 11 42.1 | 29.7 | 9.457 | 55.64 | 13 22.30 | 11.40 | 5.76 | 22 19 1.47 |
| 26 | 22 36 10.55 | 12.62 | 8 49 22.4 | 10.1 | 9.433 | 55.99 | 13 12.43 | 11.16 | 5.67 | 22 22 58.02 |
| 27 | 22 39 56.68 | 58.72 | 8 26 54.6 | 42.4 | 9.410 | 56.30 | 13 1.99 | 10.91 | 5.59 | 22 26 54.58 |
| 28 | 22 43 42.28 | 44.29 | 8 4 19.2 | 7.1 | 9.388 | 56.62 | 12 51.04 | 10.67 | 5.52 | 22 30 51.13 |
| 29 | 22 47 27.37 | 29.34 | 7 41 36.8 | 24.8 | 9.368 | 56.89 | 12 39.58 | 10.43 | 5.45 | 22 34 47.68 |
| 30 | 22 51 11.97 | 13.90 | 7 18 47.7 | 35.8 | 9.348 | 57.17 | 12 27.62 | 10.18 | 5.37 | 22 38 44.24 |
| 31 | 22 54 56.07 | 57.97 | − 6 55 52.1 | 40.4 | 9.328 | 57.43 | +12 15.16 | 16 9.92 | 1 5.30 | 22 42 40.80 |

NOTE.—For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. | | APPARENT DECLINATION. | | HOURLY MOTION. | | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Noon. | Apparent Noon. | Mean Noon. | Apparent Noon. | Right Ascension. | Declination. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| Mar. 1 | 22 51 11.97 | 13.90 | − 7 18 47.7 | 35.8 | 9.348 | 57.17 | +12 27.62 | 16 10.18 | 1 5.37 | 22 38 44.24 |
| 2 | 22 54 56.07 | 57.97 | 6 55 52.1 | 40.4 | 9.328 | 57.43 | 12 15.16 | 9.92 | 5.30 | 22 42 40.80 |
| 3 | 22 58 39.71 | 41.57 | 6 32 50.6 | 39.1 | 9.308 | 57.69 | 12 2.26 | 9.66 | 5.23 | 22 46 37.35 |
| 4 | 23 2 22.90 | 24.72 | 6 9 43.5 | 32.2 | 9.290 | 57.89 | 11 48.90 | 9.39 | 5.16 | 22 50 33.90 |
| 5 | 23 6 5.65 | 7.43 | 5 46 31.2 | 20.0 | 9.272 | 58.10 | 11 35.09 | 9.14 | 5.10 | 22 54 30.46 |
| 6 | 23 9 47.99 | 49.73 | 5 23 14.5 | 3.5 | 9.256 | 58.29 | 11 20.87 | 8.88 | 5.04 | 22 58 27.01 |
| 7 | 23 13 29.91 | 31.62 | 4 59 53.2 | 42.4 | 9.240 | 58.48 | 11 6.24 | 8.62 | 4.98 | 23 2 23.56 |
| 8 | 23 17 11.47 | 13.13 | 4 36 28.1 | 17.5 | 9.224 | 58.63 | 10 51.22 | 8.36 | 4.93 | 23 6 20.12 |
| 9 | 23 20 52.64 | 54.26 | 4 12 59.5 | 49.1 | 9.208 | 58.77 | 10 35.85 | 8.11 | 4.88 | 23 10 16.67 |
| 10 | 23 24 33.47 | 35.05 | 3 49 27.8 | 17.6 | 9.194 | 58.87 | 10 20.12 | 7.85 | 4.84 | 23 14 13.23 |
| 11 | 23 28 13.96 | 15.50 | 3 25 53.4 | 43.4 | 9.181 | 58.97 | 10 4.07 | 7.59 | 4.79 | 23 18 9.78 |
| 12 | 23 31 54.12 | 55.61 | 3 2 16.9 | 7.2 | 9.168 | 59.06 | 9 47.67 | 7.33 | 4.75 | 23 22 6.34 |
| 13 | 23 35 33.98 | 35.43 | 2 38 38.2 | 28.7 | 9.155 | 59.15 | 9 30.99 | 7.06 | 4.70 | 23 26 2.89 |
| 14 | 23 39 13.59 | 15.00 | 2 14 58.2 | 49.0 | 9.144 | 59.18 | 9 14.05 | 6.79 | 4.66 | 23 29 59.44 |
| 15 | 23 42 52.93 | 54.29 | 1 51 17.1 | 8.2 | 9.134 | 59.23 | 8 56.82 | 6.53 | 4.63 | 23 33 56.00 |
| 16 | 23 46 32.03 | 33.35 | 1 27 35.2 | 26.6 | 9.124 | 59.25 | 8 39.37 | 6.26 | 4.59 | 23 37 52.55 |
| 17 | 23 50 10.90 | 12.17 | 1 3 52.8 | 44.5 | 9.115 | 59.28 | 8 21.70 | 6.00 | 4.56 | 23 41 49.10 |
| 18 | 23 53 49.60 | 50.83 | − 0 40 10.4 | 2.4 | 9.107 | 59.27 | 8 3.84 | 5.73 | 4.53 | 23 45 45.65 |
| 19 | 23 57 28.13 | 29.32 | + 0 16 28.3 | 20.6 | 9.102 | 59.25 | 7 45.83 | 5.47 | 4.51 | 23 49 42.21 |
| 20 | 0 1 6.52 | 7.65 | 0 7 13.2 | 20.6 | 9.097 | 59.21 | 7 27.65 | 5.20 | 4.49 | 23 53 38.76 |
| 21 | 0 4 44.77 | 45.86 | 0 30 53.8 | 60.9 | 9.091 | 59.17 | 7 9.35 | 4.92 | 4.47 | 23 57 35.29 |
| 22 | 0 8 22.91 | 23.95 | 0 54 33.1 | 39.9 | 9.087 | 59.10 | 6 50.95 | 4.64 | 4.47 | 0 1 31.87 |
| 23 | 0 12 0.99 | 1.99 | 0 18 10.6 | 17.1 | 9.085 | 59.04 | 6 32.50 | 4.36 | 4.45 | 0 5 28.42 |
| 24 | 0 15 39.03 | 39.98 | 0 41 46.3 | 52.5 | 9.084 | 58.95 | 6 13.99 | 4.08 | 4.46 | 0 9 24.98 |
| 25 | 0 19 17.05 | 17.95 | 2 5 19.6 | 35.5 | 9.084 | 58.84 | 5 55.45 | 3.79 | 4.47 | 0 13 21.53 |
| 26 | 0 22 55.06 | 55.92 | 2 28 50.3 | 55.9 | 9.084 | 58.71 | 5 36.92 | 3.51 | 4.47 | 0 17 18.08 |
| 27 | 0 26 33.08 | 33.89 | 2 52 18.1 | 23.3 | 9.085 | 58.58 | 5 18.39 | 3.23 | 4.47 | 0 21 14.64 |
| 28 | 0 30 11.15 | 11.92 | 3 15 42.6 | 47.5 | 9.087 | 58.44 | 4 59.93 | 2.94 | 4.47 | 0 25 11.19 |
| 29 | 0 33 49.28 | 50.00 | 3 39 3.5 | 8.1 | 9.090 | 58.28 | 4 41.49 | 2.65 | 4.47 | 0 29 7.74 |
| 30 | 0 37 27.49 | 28.16 | 4 2 20.4 | 24.7 | 9.094 | 58.11 | 4 23.13 | 2.37 | 4.47 | 0 33 4.30 |
| 31 | 0 41 5.80 | 6.42 | 4 25 33.2 | 37.2 | 9.098 | 57.93 | 4 4.89 | 2.09 | 4.48 | 0 37 0.85 |
| Apr. 1 | 0 44 44.22 | 44.79 | 4 48 41.1 | 44.7 | 9.102 | 57.72 | 3 46.75 | 1.81 | 4.50 | 0 40 57.41 |
| 2 | 0 48 22.78 | 23.29 | 5 11 44.1 | 47.4 | 9.108 | 57.51 | 3 28.75 | 1.53 | 4.53 | 0 44 53.96 |
| 3 | 0 52 1.48 | 1.96 | 5 34 41.6 | 44.6 | 9.116 | 57.27 | 3 10.91 | 1.25 | 4.55 | 0 48 50.52 |
| 4 | 0 55 40.34 | 40.77 | 5 57 33.4 | 36.1 | 9.123 | 57.02 | 2 53.22 | 0.98 | 4.57 | 0 52 47.07 |
| 5 | 0 59 19.40 | 19.81 | 6 20 18.9 | 21.3 | 9.130 | 56.76 | 2 35.74 | 0.70 | 4.59 | 0 56 43.62 |
| 6 | 1 2 58.64 | 59.01 | 6 42 58.0 | 60.1 | 9.138 | 56.47 | 2 18.42 | 0.42 | 4.63 | 1 0 40.18 |
| 7 | 1 6 38.09 | 38.40 | 7 5 30.1 | 31.9 | 9.146 | 56.18 | 2 1.32 | 16 0.15 | 4.67 | 1 4 36.73 |
| 8 | 1 10 17.76 | 18.02 | 7 27 54.9 | 56.4 | 9.156 | 55.87 | 1 44.44 | 15 59.88 | 4.61 | 1 8 33.28 |
| 9 | 1 13 57.67 | 57.89 | 7 50 12.2 | 13.5 | 9.167 | 55.55 | 1 27.79 | 59.61 | 4.75 | 1 12 29.84 |
| 10 | 1 17 37.82 | 38.00 | 8 12 21.3 | 22.5 | 9.178 | 55.21 | 1 11.42 | 59.34 | 4.78 | 1 16 26.39 |
| 11 | 1 21 18.23 | 18.37 | 8 34 22.0 | 22.9 | 9.189 | 54.85 | 0 55.29 | 59.07 | 4.83 | 1 20 22.95 |
| 12 | 1 24 58.92 | 59.02 | 8 36 14.2 | 14.8 | 9.201 | 54.48 | 0 39.44 | 58.80 | 4.88 | 1 24 19.50 |
| 13 | 1 28 39.92 | 39.99 | 9 17 57.2 | 57.5 | 9.214 | 54.10 | 0 23.90 | 58.54 | 4.92 | 1 28 16.05 |
| 14 | 1 32 21.24 | 21.26 | 9 39 30.9 | 31.0 | 9.228 | 53.70 | + 0 8.65 | 58.28 | 4.97 | 1 32 12.61 |
| 15 | 1 36 2.91 | 2.90 | 10 0 55.1 | 55.0 | 9.243 | 53.30 | − 0 6.25 | 58.02 | 5.02 | 1 36 9.16 |
| 16 | 1 39 44.91 | 44.86 | 10 22 9.1 | 8.8 | 9.257 | 52.88 | 0 20.80 | 57.76 | 5.07 | 1 40 5.72 |
| 17 | 1 43 27.28 | 27.20 | 10 43 12.8 | 12.3 | 9.273 | 52.44 | 0 34.97 | 57.50 | 5.13 | 1 44 2.27 |
| 18 | 1 47 10.03 | 9.91 | 10 4 5.9 | 5.1 | 9.289 | 51.99 | 0 48.77 | 57.24 | 5.19 | 1 47 58.82 |
| 19 | 1 50 53.19 | 53.03 | 11 24 47.9 | 46.9 | 9.307 | 51.52 | 1 2.17 | 56.98 | 5.24 | 1 51 55.38 |
| 20 | 1 54 36.77 | 36.58 | 11 45 18.8 | 17.7 | 9.324 | 51.04 | 1 15.15 | 56.72 | 5.31 | 1 55 51.94 |
| 21 | 1 58 20.78 | 20.55 | 12 5 38.1 | 37.0 | 9.342 | 50.55 | 1 27.68 | 56.46 | 5.37 | 1 59 48.49 |
| 22 | 2 2 5.24 | 4.98 | 12 25 45.6 | 44.5 | 9.360 | 50.06 | 1 39.79 | 56.20 | 5.44 | 2 3 45.05 |
| 23 | 2 5 50.17 | 49.88 | 12 45 41.0 | 39.9 | 9.380 | 49.56 | 1 51.41 | 55.94 | 5.50 | 2 7 41.60 |
| 24 | 2 9 35.57 | 35.24 | 13 5 24.0 | 22.8 | 9.399 | 49.02 | 2 2.58 | 55.68 | 5.57 | 2 11 38.16 |
| 25 | 2 13 21.47 | 21.12 | 13 24 54.2 | 52.8 | 9.422 | 48.49 | 2 13.23 | 55.43 | 5.64 | 2 15 34.71 |
| 26 | 2 17 7.88 | 7.50 | 13 44 11.3 | 9.7 | 9.444 | 47.94 | 2 23.38 | 55.18 | 5.71 | 2 19 31.27 |
| 27 | 2 20 54.81 | 54.40 | 14 3 15.0 | 13.2 | 9.465 | 47.38 | 2 33.00 | 54.93 | 5.79 | 2 23 27.82 |
| 28 | 2 24 42.28 | 41.84 | 14 22 4.9 | 2.9 | 9.487 | 46.79 | 2 42.08 | 54.68 | 5.86 | 2 27 24.38 |
| 29 | 2 28 30.27 | 29.81 | 14 40 40.8 | 38.6 | 9.510 | 46.20 | 2 50.63 | 54.43 | 5.94 | 2 31 20.93 |
| 30 | 2 32 18.81 | 18.34 | 14 59 2.4 | 0.1 | 9.533 | 45.60 | 2 58.66 | 54.19 | 6.02 | 2 35 17.49 |
| 31 | 2 36 7.90 | 7.41 | +15 17 9.1 | 6.8 | 9.556 | 44.99 | − 3 6.13 | 15 53.95 | 1 6.09 | 2 39 14.04 |

NOTE. —For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. |  | APPARENT DECLINATION. |  | HOURLY MOTION. |  | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean Noon. | Ap-parent Noon. | Mean Noon. | Ap-parent Noon. | Right Ascen-sion. | Decli-nation. |  |  |  |  |
|  | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| May 1 | 2 36 7.90 | 7.41 | +15 17 9.1 | 6.8 | 9.556 | 44.99 | — 3 6.13 | 15 53.95 | 1 6.09 | 2 39 14.04 |
| 2 | 2 39 57.55 | 57.04 | 15 34 60.9 | 58.5 | 9.579 | 44.34 | 3 13.04 | 53.72 | 6.17 | 2 43 10.60 |
| 3 | 2 43 47.74 | 47.21 | 15 52 37.3 | 34.9 | 9.602 | 43.69 | 3 19.41 | 53.48 | 6.25 | 2 47 7.16 |
| 4 | 2 47 38.51 | 37.96 | 16 9 57.8 | 55.4 | 9.625 | 43.02 | 3 25.19 | 53.25 | 6.34 | 2 51 3.71 |
| 5 | 2 51 29.84 | 29.28 | 16 27 2.4 | 0.0 | 9.649 | 42.36 | 3 30.42 | 53.02 | 6.42 | 2 55 0.27 |
| 6 | 2 55 21.73 | 21.15 | 16 43 50.7 | 48.3 | 9.672 | 41.67 | 3 35.08 | 52.79 | 6.49 | 2 58 56.82 |
| 7 | 2 59 14.16 | 13.57 | 17 0 22.1 | 19.7 | 9.696 | 40.97 | 3 39.21 | 52.57 | 6.59 | 3 2 53.38 |
| 8 | 3 3 7.16 | 6.55 | 17 16 36.4 | 33.9 | 9.719 | 40.24 | 3 42.76 | 52.36 | 6.67 | 3 6 49.93 |
| 9 | 3 7 0.81 | 0.09 | 17 32 33.3 | 30.8 | 9.742 | 39.51 | 3 45.77 | 52.15 | 6.76 | 3 10 46.49 |
| 10 | 3 10 54.83 | 54.21 | 17 48 12.6 | 10.2 | 9.766 | 38.77 | 3 48.22 | 51.94 | 6.84 | 3 14 43.05 |
| 11 | 3 14 49.50 | 48.88 | 18 3 33.9 | 31.5 | 9.789 | 38.02 | 3 50.11 | 51.73 | 6.92 | 3 18 39.61 |
| 12 | 3 18 44.73 | 44.11 | 18 18 37.0 | 34.6 | 9.813 | 37.26 | 3 51.44 | 51.51 | 7.01 | 3 22 36.16 |
| 13 | 3 22 40.54 | 39.91 | 18 33 21.8 | 19.4 | 9.836 | 36.48 | 3 52.19 | 51.31 | 7.09 | 3 26 32.72 |
| 14 | 3 26 36.89 | 36.26 | 18 47 47.7 | 45.3 | 9.859 | 35.69 | 3 52.40 | 51.18 | 7.18 | 3 30 29.28 |
| 15 | 3 30 33.80 | 33.17 | 19 1 54.4 | 52.0 | 9.882 | 34.89 | 3 52.04 | 50.99 | 7.26 | 3 34 25.83 |
| 16 | 3 34 31.25 | 30.62 | 19 15 41.8 | 39.5 | 9.905 | 34.08 | 3 51.15 | 50.80 | 7.34 | 3 38 22.39 |
| 17 | 3 38 29.27 | 28.63 | 19 29 9.6 | 7.4 | 9.928 | 33.26 | 3 49.69 | 50.61 | 7.42 | 3 42 18.95 |
| 18 | 3 52 27.82 | 27.19 | 19 42 17.7 | 15.6 | 9.951 | 32.43 | 3 47.69 | 50.42 | 7.50 | 3 46 15.50 |
| 19 | 3 46 26.94 | 26.31 | 19 55 5.8 | 3.8 | 9.973 | 31.60 | 3 45.14 | 50.24 | 7.58 | 3 50 12.06 |
| 20 | 3 50 26.60 | 25.97 | 20 7 33.5 | 31.6 | 9.996 | 30.74 | 3 42.04 | 50.06 | 7.66 | 3 54 8.62 |
| 21 | 3 54 26.78 | 26.17 | 20 19 40.7 | 38.9 | 10.018 | 29.88 | 3 38.42 | 49.88 | 7.73 | 3 58 5.18 |
| 22 | 3 58 27.51 | 26.91 | 20 31 27.0 | 25.3 | 10.041 | 29.01 | 3 34.24 | 49.71 | 7.81 | 4 2 1.73 |
| 23 | 4 2 28.78 | 28.19 | 20 42 52.4 | 50.8 | 10.063 | 28.14 | 3 29.52 | 49.54 | 7.88 | 4 5 58.29 |
| 24 | 4 6 30.60 | 30.02 | 20 53 56.6 | 55.0 | 10.085 | 27.24 | 3 24.27 | 49.37 | 7.94 | 4 9 54.85 |
| 25 | 4 10 32.93 | 32.36 | 21 4 39.4 | 37.9 | 10.107 | 26.35 | 3 18.48 | 49.20 | 8.01 | 4 13 51.40 |
| 26 | 4 14 35.76 | 35.21 | 21 14 60.6 | 59.2 | 10.128 | 25.44 | 3 12.22 | 49.04 | 8.08 | 4 17 47.96 |
| 27 | 4 18 39.09 | 38.56 | 21 24 59.8 | 58.5 | 10.149 | 24.52 | 3 5.45 | 48.88 | 8.14 | 4 21 44.52 |
| 28 | 4 22 42.92 | 42.41 | 21 34 36.9 | 35.7 | 10.169 | 23.60 | 2 58.17 | 48.72 | 8.21 | 4 25 41.07 |
| 29 | 4 26 47.21 | 46.72 | 21 43 51.7 | 50.6 | 10.189 | 22.66 | 2 50.44 | 48.56 | 8.26 | 4 29 37.63 |
| 30 | 4 30 51.96 | 51.49 | 21 52 43.8 | 42.8 | 10.207 | 21.72 | 2 42.25 | 48.41 | 8.32 | 4 33 34.19 |
| 31 | 4 34 57.15 | 56.71 | 22 1 13.2 | 12.3 | 10.225 | 20.77 | 2 33.62 | 48.27 | 8.38 | 4 37 30.75 |
| June 1 | 4 39 2.75 | 2.33 | 22 9 19.8 | 19.0 | 10.243 | 19.80 | 2 24.58 | 48.13 | 8.44 | 4 41 27.31 |
| 2 | 4 43 8.76 | 8.37 | 22 17 3.0 | 2.3 | 10.259 | 18.83 | 2 15.13 | 47.99 | 8.49 | 4 45 23.87 |
| 3 | 4 47 15.17 | 14.81 | 22 24 22.9 | 22.3 | 10.275 | 17.85 | 2 5.28 | 47.89 | 8.55 | 4 49 20.43 |
| 4 | 4 51 21.91 | 21.58 | 22 31 19.4 | 18.9 | 10.289 | 16.88 | 1 55.08 | 47.77 | 8.60 | 4 53 16.97 |
| 5 | 4 55 28.98 | 28.68 | 22 37 52.3 | 51.8 | 10.303 | 15.88 | 1 44.58 | 47.65 | 8.65 | 4 57 13.54 |
| 6 | 4 59 36.37 | 36.10 | 22 44 1.3 | 0.9 | 10.315 | 14.88 | 1 33.75 | 47.54 | 8.70 | 5 1 10.10 |
| 7 | 5 3 44.05 | 43.81 | 22 49 46.3 | 46.0 | 10.325 | 13.88 | 1 22.63 | 47.43 | 8.74 | 5 5 6.66 |
| 8 | 5 7 51.97 | 51.76 | 22 55 7.2 | 6.9 | 10.335 | 12.88 | 1 11.28 | 47.33 | 8.77 | 5 9 3.22 |
| 9 | 5 11 60.13 | 59.96 | 23 0 3.9 | 3.7 | 10.345 | 11.87 | 0 59.66 | 47.23 | 8.82 | 5 12 59.78 |
| 10 | 5 16 8.51 | 8.39 | 23 4 36.4 | 36.2 | 10.354 | 10.86 | 0 47.83 | 47.14 | 8.85 | 5 16 56.34 |
| 11 | 5 20 17.12 | 17.02 | 23 8 44.5 | 44.4 | 10.363 | 9.84 | 0 35.77 | 47.06 | 8.87 | 5 20 52.89 |
| 12 | 5 24 25.89 | 25.83 | 23 12 28.1 | 28.0 | 10.369 | 8.82 | 0 23.56 | 46.99 | 8.90 | 5 24 49.45 |
| 13 | 5 28 34.81 | 34.78 | 23 15 47.2 | 47.2 | 10.374 | 7.78 | — 0 11.20 | 46.89 | 8.91 | 5 28 46.01 |
| 14 | 5 32 43.86 | 43.86 | 23 18 41.6 | 41.6 | 10.380 | 6.75 | + 0 1.29 | 46.81 | 8.93 | 5 32 42.57 |
| 15 | 5 36 53.04 | 53.08 | 23 21 11.6 | 11.6 | 10.385 | 5.73 | 0 13.90 | 46.73 | 8.95 | 5 36 39.13 |
| 16 | 5 41 2.32 | 2.40 | 23 23 16.9 | 16.9 | 10.389 | 4.71 | 0 26.62 | 46.66 | 8.96 | 5 40 35.69 |
| 17 | 5 45 11.65 | 11.76 | 23 24 57.6 | 57.6 | 10.390 | 3.68 | 0 39.42 | 46.61 | 8.97 | 5 44 32.24 |
| 18 | 5 49 21.03 | 21.18 | 23 26 13.4 | 13.4 | 10.392 | 2.64 | 0 52.25 | 46.55 | 8.97 | 5 48 28.79 |
| 19 | 5 53 30.47 | 30.65 | 23 27 4.4 | 4.4 | 10.393 | 1.62 | 1 5.12 | 46.49 | 8.98 | 5 52 25.36 |
| 20 | 5 57 39.91 | 40.13 | 23 27 30.6 | 30.6 | 10.394 | 0.59 | 1 18.00 | 46.43 | 8.98 | 5 56 21.92 |
| 21 | 6 1 49.37 | 49.63 | 23 27 32.2 | 32.2 | 10.394 | 0.44 | 1 30.89 | 46.38 | 8.98 | 6 0 18.48 |
| 22 | 6 5 58.80 | 59.10 | 23 27 9.1 | 9.1 | 10.392 | 1.48 | 1 43.78 | 46.33 | 8.97 | 6 4 15.04 |
| 23 | 6 10 8.19 | 8.53 | 23 26 21.2 | 21.1 | 10.390 | 2.50 | 1 56.62 | 46.29 | 8.97 | 6 8 11.60 |
| 24 | 6 14 17.52 | 17.89 | 23 25 8.5 | 8.3 | 10.388 | 3.52 | 2 9.39 | 46.25 | 8.96 | 6 12 8.16 |
| 25 | 6 18 26.77 | 27.18 | 23 23 31.1 | 30.9 | 10.382 | 4.55 | 2 22.09 | 46.21 | 8.94 | 6 16 4.71 |
| 26 | 6 22 35.92 | 36.36 | 23 21 29.0 | 28.7 | 10.378 | 5.58 | 2 34.68 | 46.17 | 8.93 | 6 20 1.27 |
| 27 | 6 26 44.91 | 45.39 | 23 19 2.4 | 2.1 | 10.372 | 6.61 | 2 47.11 | 46.15 | 8.89 | 6 23 57.83 |
| 28 | 6 30 53.75 | 54.27 | 23 16 11.1 | 10.7 | 10.364 | 7.64 | 2 59.38 | 46.13 | 8.86 | 6 27 54.39 |
| 29 | 6 35 2.42 | 2.97 | 23 12 55.4 | 54.9 | 10.356 | 8.65 | 3 11.47 | 46.11 | 8.83 | 6 31 50.95 |
| 30 | 6 39 10.86 | 11.45 | 23 9 15.1 | 14.5 | 10.348 | 9.67 | 3 23.35 | 46.09 | 8.80 | 6 35 47.51 |
| 31 | 6 43 19.09 | 19.70 | +23 5 10.5 | 9.9 | 10.338 | 10.68 | + 3 35.03 | 15 46.08 | 1 8.76 | 6 39 44.07 |

NOTE.—For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. |  | APPARENT DECLINATION. |  | HOURLY MOTION. |  | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean Noon. | Ap-parent Noon. | Mean Noon. | Ap-parent Noon. | Right Ascen-sion. | Decli-nation. |  |  |  |  |
|  | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| July 1 | 6 43 19.09 | 19.70 | +23 5 10.5 | 9.9 | 10.338 | 10.68 | + 3 35.03 | 15 46.08 | 1 8.76 | 6 39 44.07 |
| 2 | 6 47 27.03 | 27.68 | 23 0 41.6 | 40.9 | 10.327 | 11.69 | 3 46.42 | 46.07 | 8.72 | 6 43 40.63 |
| 3 | 6 51 34.70 | 35.39 | 22 55 48.7 | 47.9 | 10.314 | 12.68 | 3 57.54 | 46.08 | 8.67 | 6 47 37.18 |
| 4 | 6 55 42.07 | 42.79 | 22 50 31.8 | 30.9 | 10.301 | 13.68 | 4 8.36 | 46.08 | 8.62 | 6 51 33.74 |
| 5 | 6 59 49.12 | 49.85 | 22 44 51.0 | 50.0 | 10.286 | 14.67 | 4 18.85 | 46.11 | 8.57 | 6 55 30.30 |
| 6 | 7 3 55.78 | 56.54 | 22 38 46.3 | 45.2 | 10.271 | 15.67 | 4 28.94 | 46.13 | 8.52 | 6 59 26.86 |
| 7 | 7 8 2.05 | 2.84 | 22 32 18.2 | 17.0 | 10.255 | 16.66 | 4 38.65 | 46.16 | 8.47 | 7 3 23.42 |
| 8 | 7 12 7.91 | 8.75 | 22 25 26.8 | 25.5 | 10.238 | 17.62 | 4 47.97 | 46.19 | 8.43 | 7 7 19.97 |
| 9 | 7 16 13.37 | 14.21 | 22 18 12.1 | 10.7 | 10.220 | 18.58 | 4 56.86 | 46.22 | 8.38 | 7 11 16.54 |
| 10 | 7 20 18.39 | 19.26 | 22 10 34.4 | 32.9 | 10.202 | 19.53 | 5 5.35 | 46.27 | 8.33 | 7 15 13.09 |
| 11 | 7 24 22.96 | 23.83 | 22 2 33.7 | 32.0 | 10.183 | 20.49 | 5 13.35 | 46.31 | 8.26 | 7 19 9.65 |
| 12 | 7 28 27.07 | 27.96 | 21 54 10.4 | 8.6 | 10.163 | 21.42 | 5 20.89 | 46.37 | 8.19 | 7 23 6.21 |
| 13 | 7 32 30.70 | 31.61 | 21 45 24.5 | 22.6 | 10.142 | 22.36 | 5 27.96 | 46.42 | 8.13 | 7 27 2.77 |
| 14 | 7 36 33.83 | 34.75 | 21 36 16.6 | 14.6 | 10.120 | 23.28 | 5 34.54 | 46.47 | 8.06 | 7 30 59.32 |
| 15 | 7 40 36.45 | 37.39 | 21 26 46.7 | 44.6 | 10.099 | 24.20 | 5 40.59 | 46.53 | 7.99 | 7 34 55.88 |
| 16 | 7 44 38.55 | 39.50 | 21 16 55.0 | 52.8 | 10.078 | 25.10 | 5 46.13 | 46.60 | 7.92 | 7 38 52.44 |
| 17 | 7 48 40.13 | 41.10 | 21 6 41.4 | 39.1 | 10.056 | 25.99 | 5 51.15 | 46.68 | 7.84 | 7 42 49.00 |
| 18 | 7 52 41.19 | 42.17 | 20 56 6.6 | 4.1 | 10.034 | 26.87 | 5 55.66 | 46.76 | 7.77 | 7 46 45.55 |
| 19 | 7 56 41.71 | 42.70 | 20 45 10.5 | 7.9 | 10.011 | 27.76 | 5 59.60 | 46.82 | 7.68 | 7 50 42.12 |
| 20 | 8 0 41.70 | 42.70 | 20 33 53.5 | 50.7 | 9.989 | 28.63 | 6 3.04 | 46.90 | 7.61 | 7 54 38.67 |
| 21 | 8 4 41.15 | 42.16 | 20 22 15.7 | 12.8 | 9.966 | 29.50 | 6 5.92 | 46.99 | 7.53 | 7 58 35.23 |
| 22 | 8 8 40.03 | 41.05 | 20 10 17.5 | 14.5 | 9.944 | 30.33 | 6 8.23 | 47.05 | 7.45 | 8 2 31.79 |
| 23 | 8 12 38.35 | 39.36 | 19 57 58.8 | 55.7 | 9.920 | 31.18 | 6 10.00 | 47.15 | 7.37 | 8 6 28.34 |
| 24 | 8 16 36.12 | 37.15 | 19 45 20.2 | 17.0 | 9.897 | 32.01 | 6 11.21 | 47.23 | 7.29 | 8 10 24.90 |
| 25 | 8 20 33.33 | 34.35 | 19 32 21.8 | 18.6 | 9.873 | 32.84 | 6 11.86 | 47.33 | 7.20 | 8 14 21.46 |
| 26 | 8 24 29.97 | 30.99 | 19 19 3.9 | 0.6 | 9.850 | 33.64 | 6 11.94 | 47.42 | 7.12 | 8 18 18.01 |
| 27 | 8 28 26.02 | 27.03 | 19 5 26.6 | 23.2 | 9.826 | 34.44 | 6 11.42 | 47.52 | 7.03 | 8 22 14.57 |
| 28 | 8 32 21.50 | 22.51 | 18 51 30.5 | 27.0 | 9.800 | 35.21 | 6 10.37 | 47.63 | 6.93 | 8 26 11.13 |
| 29 | 8 36 16.38 | 17.38 | 18 37 15.4 | 11.9 | 9.775 | 36.00 | 6 8.69 | 47.74 | 6.84 | 8 30 7.69 |
| 30 | 8 40 10.66 | 11.65 | 18 22 41.9 | 38.3 | 9.750 | 36.75 | 6 6.42 | 47.85 | 6.75 | 8 34 4.24 |
| 31 | 8 44 4.35 | 5.33 | 18 7 50.3 | 46.7 | 9.725 | 37.51 | 6 3.54 | 47.97 | 6.67 | 8 38 0.80 |
| Aug. 1 | 8 47 57.44 | 58.40 | 17 52 40.9 | 37.2 | 9.700 | 38.24 | 6 0.07 | 48.11 | 6.58 | 8 41 57.36 |
| 2 | 8 51 49.93 | 50.88 | 17 37 13.9 | 10.1 | 9.675 | 38.98 | 5 56.00 | 48.24 | 6.49 | 8 45 53.91 |
| 3 | 8 55 41.82 | 42.75 | 17 21 29.8 | 26.0 | 9.649 | 39.68 | 5 51.32 | 48.37 | 6.40 | 8 49 50.47 |
| 4 | 8 59 33.09 | 34.01 | 17 5 28.6 | 24.8 | 9.624 | 40.39 | 5 46.01 | 48.51 | 6.32 | 8 53 47.03 |
| 5 | 9 3 23.75 | 24.65 | 16 49 10.7 | 6.8 | 9.598 | 41.07 | 5 40.13 | 48.67 | 6.24 | 8 57 43.58 |
| 6 | 9 7 13.80 | 14.68 | 16 32 36.6 | 32.7 | 9.573 | 41.75 | 5 33.63 | 48.83 | 6.15 | 9 1 40.14 |
| 7 | 9 11 3.24 | 4.11 | 16 15 46.7 | 42.8 | 9.548 | 42.39 | 5 26.50 | 48.99 | 6.07 | 9 5 36.70 |
| 8 | 9 14 52.06 | 52.91 | 15 58 41.0 | 37.2 | 9.522 | 43.04 | 5 18.76 | 49.15 | 5.99 | 9 9 33.25 |
| 9 | 9 18 40.30 | 41.12 | 15 41 20.0 | 16.2 | 9.497 | 43.67 | 5 10.45 | 49.32 | 5.90 | 9 13 29.81 |
| 10 | 9 22 27.94 | 28.74 | 15 23 44.0 | 40.3 | 9.474 | 44.30 | 5 1.53 | 49.50 | 5.82 | 9 17 26.37 |
| 11 | 9 26 15.00 | 15.76 | 15 5 53.5 | 49.9 | 9.450 | 44.90 | 4 52.03 | 49.68 | 5.74 | 9 21 22.92 |
| 12 | 9 30 1.50 | 2.23 | 14 47 48.4 | 44.8 | 9.426 | 45.49 | 4 41.99 | 49.85 | 5.66 | 9 25 19.48 |
| 13 | 9 33 47.42 | 48.12 | 14 29 29.3 | 25.8 | 9.403 | 46.07 | 4 31.36 | 50.02 | 5.58 | 9 29 16.03 |
| 14 | 9 37 32.80 | 33.47 | 14 10 56.3 | 52.9 | 9.380 | 46.66 | 4 20.18 | 50.19 | 5.50 | 9 33 12.59 |
| 15 | 9 41 17.64 | 18.28 | 13 52 9.9 | 6.7 | 9.358 | 47.20 | 4 8.48 | 50.37 | 5.43 | 9 37 9.14 |
| 16 | 9 45 1.95 | 2.56 | 13 33 10.3 | 7.2 | 9.337 | 47.75 | 3 56.22 | 50.57 | 5.35 | 9 41 5.70 |
| 17 | 9 48 45.75 | 46.33 | 13 13 57.9 | 54.9 | 9.316 | 48.28 | 3 43.49 | 50.75 | 5.28 | 9 45 2.25 |
| 18 | 9 52 29.05 | 29.60 | 12 54 32.8 | 30.0 | 9.295 | 48.80 | 3 30.24 | 50.93 | 5.21 | 9 48 58.81 |
| 19 | 9 56 11.90 | 12.40 | 12 34 55.3 | 52.7 | 9.275 | 49.30 | 3 16.52 | 51.11 | 5.13 | 9 52 55.37 |
| 20 | 9 59 54.28 | 54.75 | 12 15 5.5 | 3.0 | 9.255 | 49.81 | 3 2.34 | 51.33 | 5.06 | 9 56 51.92 |
| 21 | 10 3 36.19 | 36.62 | 11 55 4.3 | 2.0 | 9.236 | 50.28 | 2 47.69 | 51.53 | 4.99 | 10 0 48.47 |
| 22 | 10 7 17.65 | 18.04 | 11 34 51.6 | 49.4 | 9.219 | 50.75 | 2 32.59 | 51.74 | 4.92 | 10 4 45.03 |
| 23 | 10 10 58.69 | 59.04 | 11 14 27.7 | 25.7 | 9.202 | 51.20 | 2 17.08 | 51.94 | 4.86 | 10 8 41.58 |
| 24 | 10 14 39.33 | 39.64 | 10 53 52.8 | 51.0 | 9.185 | 51.66 | 2 1.17 | 52.13 | 4.80 | 10 12 38.14 |
| 25 | 10 18 19.57 | 19.84 | 10 33 7.7 | 6.1 | 9.169 | 52.09 | 1 44.87 | 52.36 | 4.74 | 10 16 34.69 |
| 26 | 10 21 59.43 | 59.66 | 10 12 12.2 | 10.8 | 9.154 | 52.51 | 1 28.17 | 52.56 | 4.68 | 10 20 31.25 |
| 27 | 10 25 38.94 | 39.12 | 9 51 6.9 | 5.7 | 9.139 | 52.89 | 1 11.13 | 52.77 | 4.63 | 10 24 27.80 |
| 28 | 10 29 18.08 | 18.22 | 9 29 52.1 | 51.1 | 9.124 | 53.29 | 0 53.72 | 52.98 | 4.59 | 10 28 24.36 |
| 29 | 10 32 56.89 | 56.98 | 9 8 28.0 | 27.3 | 9.110 | 53.66 | 0 35.98 | 53.20 | 4.53 | 10 32 20.91 |
| 30 | 10 36 35.37 | 35.42 | 8 46 54.9 | 54.5 | 9.094 | 54.04 | + 0 17.90 | 53.43 | 4.49 | 10 36 17.47 |
| 31 | 10 40 13.53 | 13.53 | + 8 25 13.7 | 13.8 | 9.083 | 54.38 | — 0 0.49 | 15 53.65 | 1 4.44 | 10 40 14.02 |

NOTE.—For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. |  | APPARENT DECLINATION. |  | HOURLY MOTION. |  | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Mean Noon. | Apparent Noon. | Mean Noon. | Apparent Noon. | Right Ascension. | Declination. |  |  |  |  |
|  | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| Sept. 1 | 10 43 51.39 | 51.34 | + 8 3 24.2 | 24.4 | 9.072 | 54.72 | — 0 19.17 | 15 53.89 | 1 4.39 | 10 44 10.57 |
| 2 | 10 47 28.94 | 28.85 | 7 41 26.9 | 27.4 | 9.059 | 55.03 | 0 38.18 | 54.12 | 4.35 | 10 48 7.13 |
| 3 | 10 51 6.21 | 6.07 | 7 19 22.0 | 22.8 | 9.047 | 55.35 | 0 57.45 | 54.36 | 4.31 | 10 52 3.68 |
| 4 | 10 54 43.20 | 43.01 | 6 57 10.3 | 11.4 | 9.036 | 55.63 | 1 17.02 | 54.62 | 4.28 | 10 56 0.24 |
| 5 | 10 58 19.95 | 19.71 | 6 34 51.7 | 53.1 | 9.027 | 55.91 | 1 36.80 | 54.87 | 4.24 | 10 59 56.79 |
| 6 | 11 1 56.50 | 56.21 | 6 12 26.7 | 28.4 | 9.018 | 56.15 | 1 56.80 | 55.12 | 4.22 | 11 3 53.34 |
| 7 | 11 5 32.82 | 32.48 | 5 49 55.6 | 57.4 | 9.009 | 56.41 | 2 17.04 | 55.37 | 4.19 | 11 7 49.90 |
| 8 | 11 9 8.93 | 8.53 | 5 27 19.0 | 21.1 | 9.001 | 56.64 | 2 37.48 | 55.63 | 4.16 | 11 11 46.46 |
| 9 | 11 12 44.87 | 44.42 | 5 4 37.0 | 39.5 | 8.993 | 56.87 | 2 58.11 | 55.88 | 4.14 | 11 15 43.01 |
| 10 | 11 16 20.67 | 20.17 | 4 41 49.8 | 52.9 | 8.989 | 57.07 | 3 18.86 | 56.14 | 4.12 | 11 19 39.56 |
| 11 | 11 19 56.33 | 55.78 | 4 18 57.9 | 61.4 | 8.984 | 57.26 | 3 39.76 | 56.41 | 4.11 | 11 23 36.12 |
| 12 | 11 23 31.86 | 31.26 | 3 56 1.6 | 5.5 | 8.979 | 57.43 | 4 0.76 | 56.67 | 4.09 | 11 27 32.67 |
| 13 | 11 27 7.32 | 6.67 | 3 33 1.1 | 5.3 | 8.975 | 57.61 | 4 21.83 | 56.93 | 4.08 | 11 31 29.22 |
| 14 | 11 30 42.71 | 42.01 | 3 9 56.7 | 61.2 | 8.972 | 57.75 | 4 42.99 | 57.19 | 4.07 | 11 35 25.78 |
| 15 | 11 34 18.08 | 17.31 | 2 46 48.8 | 53.6 | 8.972 | 57.89 | 5 4.18 | 57.45 | 4.06 | 11 39 22.33 |
| 16 | 11 37 53.40 | 52.60 | 2 23 37.7 | 42.9 | 8.973 | 58.01 | 5 25.40 | 57.71 | 4.06 | 11 43 18.88 |
| 17 | 11 41 28.74 | 27.89 | 2 0 23.6 | 29.1 | 8.973 | 58.14 | 5 46.62 | 57.97 | 4.06 | 11 47 15.44 |
| 18 | 11 45 4.10 | 3.19 | 1 37 7.1 | 12.9 | 8.974 | 58.24 | 6 7.82 | 58.23 | 4.06 | 11 51 11.99 |
| 19 | 11 48 39.50 | 38.54 | 1 13 48.1 | 54.2 | 8.977 | 58.34 | 6 28.96 | 58.49 | 4.07 | 11 55 8.55 |
| 20 | 11 52 14.99 | 13.97 | 0 50 27.2 | 33.7 | 8.981 | 58.40 | 6 50.01 | 58.75 | 4.07 | 11 59 5.10 |
| 21 | 11 55 50.59 | 49.52 | 0 27 4.5 | 11.4 | 8.986 | 58.46 | 7 10.98 | 59.01 | 4.08 | 12 3 1.65 |
| 22 | 11 59 26.27 | 25.15 | + 0 3 40.7 | 47.9 | 8.990 | 58.51 | 7 31.85 | 59.28 | 4 09 | 12 6 58.21 |
| 23 | 12 3 2.09 | 0.91 | — 0 19 44.4 | 36.8 | 8.995 | 58.55 | 7 52.57 | 59.55 | 4.11 | 12 10 54.76 |
| 24 | 12 6 38.07 | 36.84 | 0 43 10.1 | 2.2 | 9.002 | 58.56 | 8 13.13 | 15 59.82 | 4.14 | 12 14 51.31 |
| 25 | 12 10 14.24 | 12.95 | 1 6 36.1 | 27.8 | 9.009 | 58.57 | 8 33.51 | 16 0.09 | 4.16 | 12 18 47.87 |
| 26 | 12 13 50.60 | 49.26 | 1 29 61.8 | 53.2 | 9.018 | 58.56 | 8 53.70 | 0.36 | 4.19 | 12 22 44.42 |
| 27 | 12 17 27.15 | 25.77 | 1 53 27.1 | 18.1 | 9.028 | 58.54 | 9 13.70 | 0.63 | 4.22 | 12 26 40.97 |
| 28 | 12 21 3.96 | 2.52 | 2 16 51.6 | 42.3 | 9.037 | 58.49 | 9 33.46 | 0.90 | 4.25 | 12 30 37.53 |
| 29 | 12 24 40.98 | 39.49 | 2 40 15.0 | 5.4 | 9.048 | 58.44 | 9 52.97 | 1.18 | 4.29 | 12 34 34.08 |
| 30 | 12 28 18.27 | 16.74 | 3 3 36.8 | 26.9 | 9.059 | 58.35 | 10 12.22 | 1.45 | 4.33 | 12 38 30.63 |
| Oct. 1 | 12 31 55.86 | 54.27 | 3 26 56.6 | 46.4 | 9.070 | 58.27 | 10 31.20 | 1.73 | 4.39 | 12 42 27.19 |
| 2 | 12 35 33.71 | 32.09 | 3 50 13.9 | 3.5 | 9.085 | 58.17 | 10 49.88 | 2.01 | 4.43 | 12 46 23.74 |
| 3 | 12 39 11.90 | 10.22 | 4 13 28.6 | 18.0 | 9 098 | 58.06 | 11 8.24 | 2.30 | 4.48 | 12 50 20.29 |
| 4 | 12 42 50.41 | 48.68 | 4 36 40.2 | 29.2 | 9.112 | 57.92 | 11 26.28 | 2.59 | 4.53 | 12 54 16.85 |
| 5 | 12 46 29.29 | 27.51 | 4 59 48.2 | 36.9 | 9.127 | 57.76 | 11 43.95 | 2.88 | 4.59 | 12 58 13.40 |
| 6 | 12 50 8.51 | 6.68 | 5 22 52.2 | 40.7 | 9.143 | 57.59 | 12 1.29 | 3.16 | 4.65 | 13 2 9.95 |
| 7 | 12 53 48.13 | 46.26 | 5 45 52.0 | 40.3 | 9.159 | 57.40 | 12 18.24 | 3.44 | 4.71 | 13 6 6.51 |
| 8 | 12 57 28.16 | 26.24 | 6 8 47.4 | 35.4 | 9.176 | 57.20 | 12 34.77 | 3.72 | 4.77 | 13 10 3.06 |
| 9 | 13 1 8.60 | 6.64 | 6 31 37.7 | 25.5 | 9.194 | 56.98 | 12 50.89 | 4.01 | 4.84 | 13 13 59.62 |
| 10 | 13 4 49.49 | 47.48 | 6 54 22.6 | 10.3 | 9.213 | 56.75 | 13 6.53 | 4.30 | 4.91 | 13 17 56.17 |
| 11 | 13 8 30.85 | 28.79 | 7 16 62.0 | 49.5 | 9.233 | 56.51 | 13 21.71 | 4.57 | 4.99 | 13 21 52.73 |
| 12 | 13 12 12.71 | 10.60 | 7 39 35.4 | 22.8 | 9.254 | 56.25 | 13 36.42 | 4.86 | 5.07 | 13 25 49.28 |
| 13 | 13 15 55.09 | 52.94 | 8 1 62.2 | 49.5 | 9.275 | 55.98 | 13 50.59 | 5.11 | 5.15 | 13 29 45.83 |
| 14 | 13 19 38.00 | 35.82 | 8 24 22.3 | 9.3 | 9.297 | 55.69 | 14 4.24 | 5.42 | 5.23 | 13 33 42.39 |
| 15 | 13 23 21.47 | 19.24 | 8 46 35.4 | 22.2 | 9.321 | 55.39 | 14 17.33 | 5.69 | 5.31 | 13 37 38.94 |
| 16 | 13 27 5.50 | 3.24 | 9 8 41.0 | 27.7 | 9.346 | 55.07 | 14 29.85 | 5.96 | 5.40 | 13 41 35.49 |
| 17 | 13 30 50.14 | 47.83 | 9 30 39.0 | 25.6 | 9.372 | 54.74 | 14 41.80 | 6.23 | 5.48 | 13 45 32.05 |
| 18 | 13 34 35.39 | 33.05 | 9 52 28.8 | 15.4 | 9.397 | 54.39 | 14 53.11 | 6.50 | 5.57 | 13 49 28.61 |
| 19 | 13 38 21.27 | 18.90 | 10 13 69.8 | 56.3 | 9.424 | 54.03 | 15 3.79 | 6.76 | 5.66 | 13 53 25.16 |
| 20 | 13 42 7.82 | 5.41 | 10 35 42.0 | 28.4 | 9.452 | 53.64 | 15 13.80 | 7.02 | 5.75 | 13 57 21.72 |
| 21 | 13 45 55.04 | 52.61 | 10 57 4.8 | 51.1 | 9.481 | 53.24 | 15 23.15 | 7.26 | 5.85 | 14 1 18.27 |
| 22 | 13 49 42.96 | 40.50 | 11 18 17.9 | 4.2 | 9.511 | 52.83 | 15 31.78 | 7.52 | 5.95 | 14 5 14.82 |
| 23 | 13 53 31.56 | 29.08 | 11 39 21.2 | 7.5 | 9.540 | 52.41 | 15 39.75 | 7.78 | 6.04 | 14 9 11.38 |
| 24 | 13 57 20.89 | 18.38 | 12 0 13.9 | 0.2 | 9.570 | 51.95 | 15 46.97 | 8.04 | 6.14 | 14 13 7.93 |
| 25 | 14 1 10.97 | 8.42 | 12 20 55.6 | 41.9 | 9.601 | 51.49 | 15 53.46 | 8.30 | 6.25 | 14 17 4.49 |
| 26 | 14 4 61.77 | 59.19 | 12 41 25.8 | 12.1 | 9.632 | 51.00 | 15 59.21 | 8.55 | 6.36 | 14 21 1.04 |
| 27 | 14 8 53.31 | 50.72 | 13 1 44.4 | 30.8 | 9.663 | 50.52 | 16 4.24 | 8.81 | 6.47 | 14 24 57.60 |
| 28 | 14 12 45.62 | 43.02 | 13 21 50.6 | 37.1 | 9.694 | 50.00 | 16 8.49 | 9.06 | 6.57 | 14 28 54.15 |
| 29 | 14 16 38.70 | 36.08 | 13 41 44.3 | 30.9 | 9.726 | 49.46 | 16 11.98 | 9.32 | 6.68 | 14 32 50.71 |
| 30 | 14 20 32.55 | 29.91 | 14 1 24.9 | 11.7 | 9.759 | 48.90 | 16 14.69 | 9.57 | 6.79 | 14 36 47.27 |
| 31 | 14 24 27.17 | 24.51 | 14 20 52.0 | 38.9 | 9.792 | 48.34 | 16 16.63 | 9.82 | 6.91 | 14 40 43.82 |
| 32 | 14 28 22.59 | 19.92 | —14 39 65.0 | 52.1 | 9.825 | 47.75 | —16 17.77 | 16 10.07 | 1 7.02 | 14 44 40.38 |

NOTE.—For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

| Date. | APPARENT RIGHT ASCENSION. | | APPARENT DECLINATION. | | HOURLY MOTION. | | Equation of Time for Apparent Noon. | Semi-diameter at Apparent Noon. | Sidereal Time of Semid. passing Merid. | Sidereal Time of Mean Noon. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Noon. | Ap-parent Noon. | Mean Noon. | Ap-parent Noon. | Right Ascen-sion. | Decli-nation. | | | | |
| | h. m. s. | s. | ° ′ ″ | ″ | s. | ″ | m. s. | ′ ″ | m. s. | h. m. s. |
| Nov. 1 | 14 28 22.59 | 19.92 | —14 39 65.0 | 52.1 | 9.825 | 47.75 | —16 17.77 | 16 10.07 | 1 7.02 | 14 44 40.38 |
| 2 | 14 32 18.80 | 16.12 | 14 58 63.7 | 50.9 | 9.858 | 47.16 | 16 18.12 | 10.32 | 7.14 | 14 48 36.93 |
| 3 | 14 36 15.81 | 13.13 | 15 17 47.6 | 35.0 | 9.892 | 46.52 | 16 17.68 | 10.57 | 7.26 | 14 52 33.49 |
| 4 | 14 40 13.61 | 10.92 | 15 36 16.3 | 3.9 | 9.925 | 45.89 | 16 16.44 | 10.82 | 7.38 | 14 56 30.04 |
| 5 | 14 44 12.25 | 9.55 | 15 54 29.5 | 17.2 | 9.959 | 45.21 | 16 14.37 | 11.07 | 7.51 | 15 0 26.60 |
| 6 | 14 48 11.71 | 9.02 | 16 12 26.6 | 14.5 | 9.993 | 44.54 | 16 11.49 | 11.31 | 7.63 | 15 4 23.16 |
| 7 | 14 52 11.96 | 9.27 | 16 29 67.3 | 55.5 | 10.027 | 43.85 | 16 7.79 | 11.55 | 7.75 | 15 8 19.71 |
| 8 | 14 56 13.04 | 10.35 | 16 47 31.2 | 19.6 | 10.062 | 43.15 | 16 3.27 | 11.79 | 7.87 | 15 12 16.27 |
| 9 | 15 0 14.95 | 12.26 | 17 4 37.9 | 26.5 | 10.097 | 42.41 | 15 57.93 | 12.02 | 7.98 | 15 16 12.83 |
| 10 | 15 4 17.72 | 15.03 | 17 21 27.0 | 15.9 | 10.132 | 41.68 | 15 51.72 | 12.26 | 8.10 | 15 20 9.38 |
| 11 | 15 8 21.31 | 18.63 | 17 37 58.3 | 47.6 | 10.167 | 40.93 | 15 44.70 | 12.48 | 8.22 | 15 24 5.94 |
| 12 | 15 12 25.74 | 23.08 | 17 54 11.2 | 0.8 | 10.202 | 40.17 | 15 36.83 | 12.70 | 8.33 | 15 28 2.49 |
| 13 | 15 16 31.00 | 28.36 | 18 9 65.4 | 55.3 | 10.237 | 39.37 | 15 28.14 | 12.91 | 8.45 | 15 31 59.05 |
| 14 | 15 20 37.11 | 34.49 | 18 25 40.7 | 30.9 | 10.272 | 38.58 | 15 18.60 | 13.12 | 8.57 | 15 35 55.61 |
| 15 | 15 24 44.11 | 41.50 | 18 40 56.4 | 46.9 | 10.308 | 37.75 | 15 8.16 | 13.32 | 8.68 | 15 39 52.16 |
| 16 | 15 28 51.96 | 49.37 | 18 55 52.3 | 43.1 | 10.344 | 36.93 | 14 56.87 | 13.52 | 8.79 | 15 43 48.72 |
| 17 | 15 33 0.66 | 58.10 | 19 10 28.2 | 19.4 | 10.380 | 36.09 | 14 44.74 | 13.72 | 8.91 | 15 47 45.28 |
| 18 | 15 37 10.19 | 7.66 | 19 24 43.6 | 35.1 | 10.416 | 35.24 | 14 31.78 | 13.92 | 9.02 | 15 51 41.84 |
| 19 | 15 41 20.58 | 18.08 | 19 38 37.8 | 29.6 | 10.451 | 34.34 | 14 17.95 | 14.09 | 9.15 | 15 55 38.39 |
| 20 | 15 45 31.82 | 29.36 | 19 52 10.8 | 2.9 | 10.485 | 33.44 | 14 3.27 | 14.28 | 9.25 | 15 59 34.95 |
| 21 | 15 49 43.86 | 41.44 | 20 5 22.0 | 14.4 | 10.518 | 32.52 | 13 47.80 | 14.46 | 9.36 | 16 3 31.51 |
| 22 | 15 53 56.69 | 54.32 | 20 18 11.3 | 4.1 | 10.552 | 31.60 | 13 31.52 | 14.64 | 9.47 | 16 7 28.06 |
| 23 | 15 58 10.33 | 8.00 | 20 30 38.1 | 31.2 | 10.586 | 30.64 | 13 14.44 | 14.82 | 9.57 | 16 11 24.62 |
| 24 | 16 2 24.78 | 22.49 | 20 42 42.3 | 35.8 | 10.618 | 29.69 | 12 56.56 | 14.99 | 9.67 | 16 15 21.18 |
| 25 | 16 6 40.01 | 37.76 | 20 54 23.0 | 16.9 | 10.648 | 28.71 | 12 37.89 | 15.15 | 9.78 | 16 19 17.74 |
| 26 | 16 10 55.98 | 53.78 | 21 5 40.3 | 34.5 | 10.679 | 27.74 | 12 18.48 | 15.32 | 9.88 | 16 23 14.30 |
| 27 | 16 15 12.65 | 10.50 | 21 16 33.9 | 28.5 | 10.709 | 26.74 | 11 58.38 | 15.49 | 9.98 | 16 27 10.86 |
| 28 | 16 19 30.04 | 27.95 | 21 26 63.3 | 58.2 | 10.738 | 25.72 | 11 37.53 | 15.65 | 10.08 | 16 31 7.41 |
| 29 | 16 23 48.11 | 46.08 | 21 37 8.0 | 3.3 | 10.765 | 24.69 | 11 16.04 | 15.81 | 10.17 | 16 35 3.97 |
| 30 | 16 28 6.86 | 4.89 | 21 46 48.1 | 43.7 | 10.802 | 23.65 | 10 53.84 | 15.98 | 10.26 | 16 39 0.53 |
| Dec. 1 | 16 32 26.23 | 24.32 | 21 55 63.1 | 59.0 | 10.819 | 22.59 | 10 31.03 | 16.13 | 10.35 | 16 42 57.09 |
| 2 | 16 36 46.20 | 44.37 | 22 4 52.6 | 48.9 | 10.845 | 21.52 | 10 7.61 | 16.29 | 10.44 | 16 46 53.65 |
| 3 | 16 41 6.77 | 5.00 | 22 13 16.5 | 13.1 | 10.870 | 20.45 | 9 43.59 | 16.43 | 10.52 | 16 50 50.21 |
| 4 | 16 45 27.90 | 26.20 | 22 21 14.4 | 11.3 | 10.893 | 19.37 | 9 19.01 | 16.58 | 10.60 | 16 54 46.76 |
| 5 | 16 49 49.58 | 47.95 | 22 28 46.3 | 43.5 | 10.914 | 18.28 | 8 53.90 | 16.69 | 10.69 | 16 58 43.32 |
| 6 | 16 54 11.75 | 10.21 | 22 35 51.7 | 49.1 | 10.934 | 17.19 | 8 28.29 | 16.82 | 10.75 | 17 2 39.88 |
| 7 | 16 58 34.41 | 32.95 | 22 42 30.6 | 28.3 | 10.954 | 16.08 | 8 2.18 | 16.96 | 10.82 | 17 6 36.44 |
| 8 | 17 2 57.51 | 56.13 | 22 48 42.8 | 40.8 | 10.973 | 14.95 | 7 35.63 | 17.08 | 10.88 | 17 10 33.00 |
| 9 | 17 7 21.04 | 19.74 | 22 54 27.9 | 26.2 | 10.991 | 13.81 | 7 8.65 | 17.19 | 10.93 | 17 14 29.56 |
| 10 | 17 11 45.00 | 43.78 | 22 59 45.9 | 44.4 | 11.008 | 12.67 | 6 41.25 | 17.30 | 10.98 | 17 18 26.12 |
| 11 | 17 16 9.35 | 8.23 | 23 4 36.6 | 35.3 | 11.022 | 11.54 | 6 13.45 | 17.41 | 11.03 | 17 22 22.67 |
| 12 | 17 20 34.04 | 33.02 | 23 8 59.9 | 58.7 | 11.037 | 10.40 | 5 45.30 | 17.51 | 11.08 | 17 26 19.23 |
| 13 | 17 24 59.07 | 58.12 | 23 12 55.7 | 54.7 | 11.051 | 9.25 | 5 16.83 | 17.61 | 11.12 | 17 30 15.79 |
| 14 | 17 29 24.42 | 23.54 | 23 16 23.7 | 22.9 | 11.063 | 8.10 | 4 48.04 | 17.70 | 11.16 | 17 34 12.35 |
| 15 | 17 33 50.05 | 49.25 | 23 19 23.8 | 23.2 | 11.074 | 6.93 | 4 18.97 | 17.76 | 11.21 | 17 38 8.91 |
| 16 | 17 38 15.87 | 15.16 | 23 21 56.0 | 55.5 | 11.081 | 5.76 | 3 49.69 | 17.85 | 11.23 | 17 42 5.47 |
| 17 | 17 42 41.92 | 41.30 | 23 23 60.2 | 59.8 | 11.088 | 4.60 | 3 20.20 | 17.91 | 11.26 | 17 46 2.03 |
| 18 | 17 47 8.16 | 7.63 | 23 25 36.4 | 36.1 | 11.097 | 3.43 | 2 50.51 | 17.98 | 11.28 | 17 49 58.59 |
| 19 | 17 51 34.53 | 34.09 | 23 26 44.3 | 44.1 | 11.101 | 2.24 | 2 20.68 | 18.04 | 11.30 | 17 53 55.15 |
| 20 | 17 56 1.04 | 0.70 | 23 27 23.9 | 23.8 | 11.105 | 1.05 | 1 50.72 | 18.08 | 11.30 | 17 57 51.71 |
| 21 | 18 0 27.60 | 27.35 | 23 27 35.2 | 35.1 | 11.108 | 0.87 | 1 20.69 | 18.13 | 11.31 | 18 1 48.26 |
| 22 | 18 4 54.23 | 54.08 | 23 27 18.4 | 18.3 | 11.109 | 0.29 | 0 50.61 | 18.17 | 11.31 | 18 5 44.82 |
| 23 | 18 9 20.86 | 20.80 | 23 26 33.1 | 33.1 | 11.108 | 1.47 | — 0 20.52 | 18.21 | 11.31 | 18 9 41.38 |
| 24 | 18 13 47.47 | 47.50 | 23 25 19.4 | 19.4 | 11.106 | 3.65 | + 0 9.54 | 18.24 | 11.29 | 18 13 37.94 |
| 25 | 18 18 14.01 | 14.13 | 23 23 37.5 | 37.5 | 11.103 | 4.82 | 0 39.50 | 18.27 | 11.28 | 18 17 34.50 |
| 26 | 18 22 40.45 | 40.66 | 23 21 27.3 | 27.2 | 11.098 | 6.00 | 1 9.36 | 18.30 | 11.27 | 18 21 31.06 |
| 27 | 18 27 6.73 | 7.03 | 23 18 48.8 | 48.6 | 11.092 | 7.18 | 1 39.07 | 18.33 | 11.25 | 18 25 27.62 |
| 28 | 18 31 32.82 | 33.21 | 23 15 42.3 | 42.0 | 11.084 | 8.36 | 2 8.66 | 18.35 | 11.23 | 18 29 24.18 |
| 29 | 18 35 58.67 | 59.15 | 23 12 7.8 | 7.5 | 11.073 | 8.51 | 2 37.98 | 18.37 | 11.19 | 18 33 20.74 |
| 30 | 18 40 24.29 | 24.86 | 23 8 5.3 | 4.8 | 11.061 | 10.67 | 3 7.05 | 18.38 | 11.16 | 18 37 17.30 |
| 31 | 18 44 49.58 | 50.24 | 23 3 35.0 | 34.4 | 11.048 | 11.82 | 3 35.79 | 18.38 | 11.12 | 18 41 13.85 |
| 32 | 18 59 14.54 | 15.28 | —22 58 37.1 | 36.5 | 11.031 | 12.97 | + 4 4.19 | 16 18.38 | 1 11.07 | 18 45 10.41 |

**Note.**—For *Mean* Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Jan. 1 | 1 | II. L. | 13 43 14.63 | 2.06145 | 63.19 | —10 15 15.7 | —2.92048 |
| 1 | 1 | II. U. | 14 6 39.17 | 2.07569 | 64.24 | —12 59 29.4 | —2.90741 |
| 2 | 2 | II. L. | 14 30 54.92 | 2.09243 | 65.48 | —15 37 49.2 | —2.88843 |
| 2 | 2 | II. U. | 14 56 11.18 | 2.11094 | 66.91 | —18 8 6.7 | —2.86172 |
| 3 | 3 | II. L. | 15 22 36.23 | 2.13082 | 68.47 | —20 27 52.6 | —2.82474 |
| 3 | 3 | II. U. | 15 50 16.62 | 2.15118 | 70.10 | —22 34 16.7 | —2.77339 |
| 4 | 4 | II. L. | 16 19 15.96 | 2.17106 | 71.76 | —24 24 9.9 | —2.70109 |
| 4 | 4 | II. U. | 16 49 33.96 | 2.18937 | 73.32 | —25 54 11.2 | —2.59627 |
| 5 | 5 | II. L. | 17 21 4.96 | 2.20502 | 74.68 | —27 0 58.3 | —2.43214 |
| 5 | 5 | II. U. | 17 53 37.55 | 2.21704 | 75.73 | —27 41 25.1 | —2.11986 |
| 6 | 6 | II. L. | 18 26 54.56 | 2.22443 | 76.41 | —27 53 0.8 | +1.23605 |
| 6 | 6 | II. U. | 19 0 34.51 | 2.22692 | 76.63 | —27 34 10.6 | +2.23427 |
| 7 | 7 | I. L. | 19 31 41.16 | 2.22449 | 76.42 | —26 44 28.2 | +2.51180 |
| 8 | 7 | I. U. | 20 4 59.11 | 2.21752 | 75.79 | —25 24 42.7 | +2.67304 |
| 8 | 8 | I. L. | 20 37 36.37 | 2.20682 | 74.84 | —23 36 52.0 | +2.78168 |
| 9 | 8 | I. U. | 21 9 19.70 | 2.19347 | 73.68 | —21 23 49.6 | +2.85883 |
| 9 | 9 | I. L. | 21 40 1.91 | 2.17859 | 72.42 | —18 49 05.8 | +2.91462 |
| 10 | 9 | I. U. | 22 9 41.42 | 2.16359 | 71.18 | —15 56 29.8 | +2.95477 |
| 10 | 10 | I. L. | 22 38 21.43 | 2.14931 | 70.02 | —12 49 55.5 | +2.98991 |
| 11 | 10 | I. U. | 23 6 8.48 | 2.13656 | 69.10 | — 9 33 8.5 | +3.00144 |
| 11 | 11 | I. L. | 23 33 11.28 | 2.12604 | 68.20 | — 6 9 42.6 | +3.01203 |
| 12 | 11 | I. U. | 23 59 40.00 | 2.11814 | 67.60 | — 2 42 55.0 | +3.01585 |
| 12 | 12 | I. L. | 0 25 45.41 | 2.11322 | 67.24 | + 0 44 12.4 | +3.01354 |
| 13 | 13 | I. U. | 0 51 38.34 | 2.11121 | 67.10 | + 4 8 52.0 | +3.00547 |
| 13 | 13 | I. L. | 1 17 29.42 | 2.11216 | 67.18 | + 7 28 28.0 | +2.99174 |
| 14 | 14 | I. U. | 1 43 28.63 | 2.11573 | 67.47 | +10 40 32.7 | +2.97198 |
| 14 | 14 | I. L. | 2 9 45.12 | 2.12161 | 67.95 | +13 42 44.4 | +2.94567 |
| 15 | 15 | I. U. | 2 36 26.68 | 2.12933 | 68.57 | +16 32 45.2 | +2.91162 |
| 15 | 15 | I. L. | 3 3 39.40 | 2.13829 | 69.29 | +19 8 20.7 | +2.86814 |
| 16 | 16 | I. U. | 3 31 27.21 | 2.14767 | 70.04 | +21 27 19.7 | +2.81284 |
| 16 | 16 | I. L. | 3 59 51.25 | 2.15679 | 70.77 | +23 27 37.4 | +2.74157 |
| 17 | 17 | I. U. | 4 28 49.50 | 2.16482 | 71.42 | +25 7 19.7 | +2.64758 |
| 17 | 17 | I. L. | 4 58 16.59 | 2.17093 | 71.90 | +26 24 48.6 | +2.51785 |
| 18 | 18 | I. U. | 5 28 3.86 | 2.17458 | 72.18 | +27 18 50.7 | +2.32226 |
| 18 | 18 | I. L. | 5 57 59.96 | 2.17516 | 72.18 | +27 48 40.9 | +1.94571 |
| 19 | 19 | I. U. | 6 27 51.77 | 2.17246 | 71.90 | +27 54 10.2 | —1.51882 |
| 19 | 19 | I. L. | 6 57 25.82 | 2.16652 | 71.36 | +27 35 44.1 | —2.17758 |
| 20 | 20 | I. U. | 7 26 29.58 | 2.15758 | 70.58 | +26 54 24.2 | —2.41751 |
| 20 | 20 | I. L. | 7 54 52.66 | 2.14615 | 69.59 | +25 51 39.3 | —2.56135 |
| 21 | 21 | II. U. | 8 24 44.45 | 2.13210 | 68.48 | +24 29 21.4 | —2.65996 |
| 22 | 21 | II. L. | 8 51 24.27 | 2.11746 | 67.31 | +22 49 34.5 | —2.73167 |
| 22 | 22 | II. U. | 9 17 10.05 | 2.10234 | 66.11 | +20 54 29.1 | —2.78528 |
| 23 | 22 | II. L. | 9 42 3.25 | 2.08752 | 64.98 | +18 46 14.1 | —2.82691 |
| 23 | 23 | II. U. | 10 6 7.34 | 2.07341 | 63.93 | +16 27 41.2 | —2.85802 |
| 24 | 23 | II. L. | 10 29 27.63 | 2.06085 | 63.04 | +13 58 23.1 | —2.88223 |
| 24 | 24 | II. U. | 10 52 9.93 | 2.04980 | 62.22 | +11 22 29.3 | —2.90054 |
| 25 | 24 | II. L. | 11 14 21.80 | 2.04116 | 61.60 | + 8 40 49.1 | —2.91395 |
| 25 | 25 | II. U. | 11 36 10.70 | 2.03483 | 61.17 | + 5 54 50.4 | —2.92341 |
| 26 | 25 | II. L. | 11 57 44.65 | 2.03116 | 60.94 | + 3 5 54.6 | —2.92936 |
| 26 | 26 | II. U. | 12 19 11.92 | 2.03030 | 60.91 | + 0 15 17.3 | —2.93210 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Jan. 27 | 27 | II. L. | 12 40 41.08 | 2.03238 | 61.07 | — 2 35 48.4 | —2.93178 |
| 27 | 27 | II. U. | 13 2 20.88 | 2.03747 | 61.47 | — 5 26 10.3 | —2.92829 |
| 28 | 28 | II. L. | 13 24 20.31 | 2.04544 | 62.07 | — 8 14 33.0 | —2.92154 |
| 28 | 28 | II. U. | 13 46 48.63 | 2.05625 | 62.87 | —10 59 36.5 | —2.91094 |
| 29 | 29 | II. L. | 14 9 55.17 | 2.06967 | 63.88 | —13 39 52.0 | —2.89572 |
| 29 | 29 | II. U. | 14 33 49.29 | 2.08540 | 65.08 | —16 13 38.4 | —2.87471 |
| 30 | 30 | II. L. | 14 58 40.06 | 2.10312 | 66.45 | —18 38 59.6 | —2.84632 |
| 30 | 30 | II. U. | 15 24 35.79 | 2.12241 | 67.94 | —20 53 42.1 | —2.80797 |
| 31 | 31 | II. L. | 15 51 43.41 | 2.14236 | 69.56 | —22 55 12.9 | —2.75565 |
| Feb. 1 | 31 | II. U. | 16 20 7.48 | 2.16212 | 71.23 | —24 40 41.4 | —2.68304 |
| 1 | 32 | II. L. | 16 49 49.12 | 2.18079 | 72.81 | —26 7 2.3 | —2.57803 |
| 2 | 32 | II. U. | 17 20 44.97 | 2.19736 | 74.23 | —27 11 5.0 | —2.41371 |
| 2 | 33 | II. L. | 17 52 46.42 | 2.21077 | 75.40 | —27 49 45.4 | —2.09795 |
| 3 | 33 | II. U. | 18 25 39.20 | 2.22014 | 76.23 | —28 0 24.8 | +1.30710 |
| 3 | 34 | II. L. | 18 59 4.54 | 2.22495 | 76.64 | —27 41 6.6 | +2.23907 |
| 4 | 34 | II. U. | 19 32 40.83 | 2.22495 | 76.62 | —26 50 56.2 | +2.51642 |
| 4 | 35 | II. L. | 20 6 6.44 | 2.22042 | 76.19 | —25 30 8.1 | +2.68000 |
| 5 | 35 | II. U. | 20 39 2.22 | 2.21206 | 75.42 | —23 40 9.2 | +2.79148 |
| 5 | 36 | II. L. | 21 11 13.82 | 2.20099 | 74.41 | —21 23 28.8 | +2.87181 |
| 6 | 36 | I. U. | 21 40 5.60 | 2.18851 | 73.28 | —18 43 27.5 | +2.93049 |
| 6 | 37 | I. L. | 22 10 29.73 | 2.17502 | 72.14 | —15 43 56.7 | +2.97285 |
| 7 | 37 | I. U. | 22 39 58.76 | 2.16203 | 71.05 | —12 29 5.3 | +3.00245 |
| 7 | 38 | I. L. | 23 8 37.71 | 2.15033 | 70.09 | — 9 3 5.2 | +3.02158 |
| 8 | 38 | I. U. | 23 36 34.26 | 2.14054 | 69.31 | — 5 30 1.8 | +3.03196 |
| 8 | 39 | I. L. | 0 3 57.70 | 2.13309 | 68.75 | — 1 53 48.5 | +3.03460 |
| 9 | 40 | I. U. | 0 30 58.09 | 2.12827 | 68.41 | + 1 41 58.0 | +3.03024 |
| 9 | 40 | I. L. | 0 57 45.70 | 2.12620 | 68.30 | + 5 13 57.9 | +3.01927 |
| 10 | 41 | I. U. | 1 24 30.58 | 2.12675 | 68.38 | + 8 39 7·5 | +3.00174 |
| 10 | 41 | I. L. | 1 51 22.01 | 2.12966 | 68.65 | +11 54 38.8 | +2.97731 |
| 11 | 42 | I. U. | 2 18 28.23 | 2.13459 | 69.07 | +14 57 56.9 | +2.94545 |
| 11 | 42 | I. L. | 2 45 55.91 | 2.14101 | 69.62 | +17 46 38.8 | +2.90493 |
| 12 | 43 | I. U. | 3 13 49.94 | 2.14826 | 70.25 | +20 18 32.8 | +2.85385 |
| 12 | 43 | I. L. | 3 42 12.78 | 2.15567 | 70.88 | +22 31 38.9 | +2.78925 |
| 13 | 44 | I. U. | 4 11 3.96 | 2.16250 | 71.44 | +24 24 10.2 | +2.70646 |
| 14 | 44 | I. L. | 4 40 20.17 | 2.16803 | 71.89 | +25 54 36.9 | +2.59671 |
| 14 | 45 | I. U. | 5 9 55.06 | 2.17161 | 72.18 | +27 1 49.7 | +2.44189 |
| 15 | 45 | I. L. | 5 39 39.59 | 2.17266 | 72.24 | +27 45 4.9 | +2.19173 |
| 15 | 46 | I. U. | 6 9 22.82 | 2.17088 | 72.04 | +28 4 8.0 | +1.53877 |
| 16 | 46 | I. L. | 6 38 52.92 | 2.16619 | 71.59 | +27 59 14.9 | —1.92117 |
| 16 | 47 | I. U. | 7 7 58.40 | 2.15872 | 70.91 | +27 31 11.8 | —2.29300 |
| 17 | 47 | I. L. | 7 36 29.04 | 2.14876 | 70.03 | +26 41 11.6 | —2.48043 |
| 17 | 48 | I. U. | 8 4 16.87 | 2.13682 | 68.99 | +25 30 49.1 | —2.60181 |
| 18 | 48 | I. L. | 8 31 16.57 | 2.12349 | 67.86 | +24 1 53.8 | —2.68822 |
| 18 | 49 | I. U. | 8 57 25.57 | 2.10931 | 66.70 | +22 16 24.4 | —2.75243 |
| 19 | 49 | I. L. | 9 22 43.74 | 2.09496 | 65.55 | +20 16 22.9 | —2.80142 |
| 19 | 50 | I. U. | 9 47 13.20 | 2.08103 | 64.46 | +18 3 49.4 | —2.83929 |
| 20 | 50 | I. L. | 10 10 57.74 | 2.06808 | 63.47 | +15 40 39.9 | —2.86863 |
| 20 | 51 | II. U. | 10 36 7.69 | 2.05618 | 62.60 | +13 8 45.2 | —2.89120 |
| 21 | 51 | II. L. | 10 58 37.16 | 2.04630 | 61.88 | +10 29 48.4 | —2.90821 |
| 21 | 52 | II. U. | 11 20 39.82 | 2.03862 | 61.33 | + 7 45 25.6 | —2.92054 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Feb. 22 | 52 | II. L. | 11 42 22.77 | 2.03330 | 60.96 | + 4 57 7.1 | —2.92888 |
| 22 | 53 | II. U. | 12 8 53.43 | 2.03044 | 60.78 | + 2 6 18.0 | —2.93352 |
| 23 | 54 | II. L. | 12 25 19.47 | 2.03019 | 60.79 | — 0 45 40.3 | —2.93480 |
| 23 | 54 | II. U. | 12 46 48.76 | 2.03262 | 60.99 | — 3 37 28.6 | —2.93268 |
| 24 | 55 | II. L. | 13 8 29.32 | 2.03774 | 61.38 | — 6 27 47.7 | —2.92718 |
| 24 | 55 | II. U. | 13 30 29.29 | 2.04552 | 61.98 | — 9 15 16.8 | —2.91799 |
| 25 | 56 | II. L. | 13 52 57.02 | 2.05580 | 62.78 | —11 58 30.3 | —2.90466 |
| 25 | 56 | II. U. | 14 16 0.89 | 2.06838 | 63.76 | —14 35 56.7 | —2.88647 |
| 26 | 57 | II. L. | 14 39 49.10 | 2 08307 | 64.90 | —17 5 55.6 | —2.86225 |
| 26 | 57 | II. U. | 15 4 29.48 | 2.09948 | 66.20 | —19 26 34.5 | —2.83027 |
| 27 | 58 | II. L. | 15 30 9.17 | 2.11711 | 67.62 | —21 35 48.8 | —2.78811 |
| 27 | 58 | II. U. | 15 56 53.83 | 2.13529 | 69.11 | —23 31 19.5 | —2.73167 |
| 28 | 59 | II. L. | 16 24 47.05 | 2.15329 | 70.62 | —25 10 35.4 | —2.65437 |
| 28 | 59 | II. U. | 16 53 49.57 | 2.17032 | 72.07 | —26 30 56.2 | —2.54372 |
| 29 | 60 | II. L. | 17 23 58.35 | 2.18557 | 73.39 | —27 29 35.9 | —2.37036 |
| 29 | 60 | II. U. | 17 55 6.08 | 2.19808 | 74.49 | —28 3 57.5 | —2.02935 |
| Mar. 1 | 61 | II. L. | 18 27 1.05 | 2.20720 | 75.29 | —28 11 42.6 | +1.49136 |
| 1 | 61 | II. U. | 18 59 27.98 | 2.21243 | 75.75 | —27 51 5.7 | +2.24551 |
| 2 | 62 | II. L. | 19 32 9.19 | 2.21357 | 75.83 | —27 1 7.6 | +2.51014 |
| 2 | 62 | II. U. | 20 4 46.81 | 2.21088 | 75.55 | —25 41 44.6 | +2.67136 |
| 3 | 63 | II. L. | 20 37 4.70 | 2.20491 | 74.98 | —23 53 51.6 | +2.78383 |
| 3 | 63 | II. U. | 21 8 50.23 | 2.19640 | 74.19 | —21 39 19.0 | +2.86641 |
| 4 | 64 | II. L. | 21 39 55.09 | 2.18631 | 73.28 | —19 0 46.5 | +2.92809 |
| 4 | 64 | II. U. | 22 10 15.77 | 2.17569 | 72.34 | —16 1 31.0 | +2.97405 |
| 5 | 65 | II. L. | 22 39 52.91 | 2.16545 | 71.44 | —12 45 16.8 | +3.00736 |
| 6 | 65 | II. U. | 23 8 50.64 | 2.15634 | 70.66 | — 9 16 3.7 | +3.03003 |
| 6 | 66 | I. L. | 23 34 55.44 | 2.14922 | 70.04 | — 5 38 0.5 | +3.04356 |
| 7 | 67 | I. U. | 0 2 56.70 | 2.14398 | 69.62 | — 1 55 14.3 | +3.04875 |
| 7 | 67 | I. L. | 0 30 42.26 | 2.14114 | 69.42 | + 1 48 12.2 | +3.04622 |
| 8 | 68 | I. U. | 0 58 21.62 | 2.14073 | 69.43 | + 5 28 25.5 | +3.03619 |
| 8 | 68 | I. L. | 1 26 3.93 | 2.14267 | 69.64 | + 9 1 45.0 | +3.01853 |
| 9 | 69 | I. U. | 1 53 57.65 | 2.14659 | 70.01 | +12 24 44.3 | +2.99286 |
| 9 | 69 | I. L. | 2 22 9.78 | 2.15214 | 70.51 | +15 34 13.4 | +2.95842 |
| 10 | 70 | I. U. | 2 50 45.64 | 2.15860 | 71.10 | +18 27 19.6 | +2.91387 |
| 10 | 70 | I. L. | 3 19 48.16 | 2.16539 | 71.72 | +21 1 29.5 | +2.85709 |
| 11 | 71 | I. U. | 3 49 17.52 | 2.17176 | 72.30 | +23 14 29.9 | +2.78462 |
| 11 | 71 | I. L. | 4 19 10.75 | 2.17690 | 72.77 | +25 4 33.1 | +2.69055 |
| 12 | 72 | I. U. | 4 49 21.88 | 2.18021 | 73.06 | +26 30 18.2 | +2.56396 |
| 12 | 72 | I. L. | 5 19 42.02 | 2.18119 | 73.14 | +27 30 55.7 | +2.37949 |
| 13 | 73 | I. U. | 5 50 0.27 | 2.17932 | 72.98 | +28 6 8.6 | +2.05269 |
| 13 | 73 | I. L. | 6 20 4.63 | 2.17450 | 72.55 | +28 16 13.8 | —1.04532 |
| 14 | 74 | I. U. | 6 49 43.35 | 2.16684 | 71.86 | +28 2 0.1 | —2.11361 |
| 14 | 74 | I. L. | 7 18 45.93 | 2.15670 | 70.96 | +27 24 43.3 | —2.38274 |
| 15 | 75 | I. U. | 7 47 3.94 | 2.14451 | 69.89 | +26 26 0.2 | —2.53668 |
| 15 | 75 | I. L. | 8 14 32.10 | 2.13085 | 68.72 | +25 7 42.3 | —2.64058 |
| 16 | 76 | I. U. | 8 41 7.33 | 2.11631 | 67.50 | +23 31 48.6 | —2.71609 |
| 16 | 76 | I. L. | 9 6 49.51 | 2.10154 | 66.27 | +21 40 20.1 | —2.77313 |
| 17 | 77 | I. U. | 9 31 40.63 | 2.08711 | 65.12 | +19 35 15.7 | —2.81710 |
| 17 | 77 | I. L. | 9 55 44.33 | 2.07357 | 64.09 | +17 18 29.3 | —2.85132 |
| 18 | 78 | I. U. | 10 19 5.94 | 2 06138 | 63.07 | +14 51 49.1 | —2.87806 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Mar. 18 | 78 | I. L. | 10 41 51.05 | 2.05084 | 62.27 | +12 16 57.2 | —2.89883 |
| 19 | 79 | I. U. | 11 4 6.39 | 2.04622 | 61.62 | + 9 35 29.4 | —2.91455 |
| 19 | 79 | I. L. | 11 25 58.87 | 2.03591 | 61.15 | + 6 48 55.9 | —2.92593 |
| 20 | 80 | I. U. | 11 47 35.73 | 2.03193 | 60.85 | + 3 58 43.4 | —2.93339 |
| 21 | 81 | II. L. | 12 11 5.76 | 2.03036 | 60.74 | + 1 6 16.2 | —2.93732 |
| 21 | 81 | II. U. | 12 32 33.65 | 2.03149 | 60.82 | — 1 47 2.9 | —2.93777 |
| 22 | 82 | II. L. | 12 54 8.68 | 2.03515 | 61.09 | — 4 39 50.4 | —2.93465 |
| 22 | 82 | II. U. | 13 15 58.45 | 2.04127 | 61.55 | — 7 30 41.1 | —2.92783 |
| 23 | 83 | II. L. | 13 38 10.60 | 2.04980 | 62.20 | —10 18 6.1 | —2.91698 |
| 23 | 83 | II. U. | 14 0 52.76 | 2.06055 | 63.03 | —13 0 31.8 | —2.90146 |
| 24 | 84 | II. L. | 14 24 12.33 | 2.07328 | 64.02 | —15 36 17.4 | —2.88036 |
| 24 | 84 | II. U. | 14 48 16.38 | 2.08771 | 65.15 | —18 3 34.1 | —2.85248 |
| 25 | 85 | II. L. | 15 13 11.33 | 2.10336 | 66.40 | —20 20 24.7 | —2.81604 |
| 25 | 85 | II. U. | 15 39 2.48 | 2.11968 | 67.74 | —22 24 42.0 | —2.76819 |
| 26 | 86 | II. L. | 16 5 53.47 | 2.13609 | 69.11 | —24 14 10.4 | —2.70449 |
| 26 | 86 | II. U. | 16 33 45.72 | 2.15192 | 70.46 | —25 46 27.2 | —2.61742 |
| 27 | 87 | II. L. | 17 2 37.70 | 2.16643 | 71.73 | —26 59 8.9 | —2.49206 |
| 27 | 87 | II. U. | 17 32 24.54 | 2.17886 | 72.84 | —27 49 55.4 | —2.29092 |
| 28 | 88 | II. L. | 18 2 57.83 | 2.18862 | 73.72 | —28 16 40.1 | —1.84819 |
| 28 | 88 | II. U. | 18 34 5.95 | 2.19521 | 74.32 | —28 17 38.5 | +1.79099 |
| 29 | 89 | II. L. | 19 5 34.93 | 2.19833 | 74.60 | —27 51 38.9 | +2.29798 |
| 29 | 89 | II. U. | 19 37 9.86 | 2.19802 | 74.56 | —26 58 8.7 | +2.52673 |
| 30 | 90 | II. L. | 20 8 36.53 | 2.19460 | 74.24 | —25 37 18.4 | +2.67330 |
| 30 | 90 | II. U. | 20 39 42.76 | 2.18862 | 73.70 | —23 50 2.8 | +2.77808 |
| 31 | 91 | II. L. | 21 10 19.72 | 2.18093 | 73.01 | —21 37 57.4 | +2.85679 |
| 31 | 91 | II. U. | 21 40 22.23 | 2.17234 | 72.23 | —19 3 11.6 | +2.91709 |
| April 1 | 92 | II. L. | 22 9 48.94 | 2.16367 | 71.45 | —16 8 25.8 | +2.96327 |
| 1 | 92 | II. U. | 22 38 41.83 | 2.15570 | 70.74 | —12 56 42.7 | +2.99808 |
| 2 | 93 | II. L. | 23 7 5.72 | 2.14910 | 70.15 | — 9 31 22.8 | +3.02321 |
| 2 | 93 | II. U. | 23 35 7.47 | 2.14439 | 69.73 | — 5 56 0.6 | +3.03973 |
| 3 | 94 | II. L. | 0 2 55.43 | 2.14198 | 69.51 | — 2 14 20.4 | +3.04833 |
| 3 | 95 | II. U. | 0 30 38.66 | 2.14198 | 69.50 | + 1 29 46.2 | +3.04930 |
| 4 | 95 | II. L. | 0 58 26.52 | 2.14440 | 69.69 | + 5 12 25.0 | +3.04261 |
| 5 | 96 | I. U. | 1 24 7.92 | 2.14876 | 70.08 | + 8 49 41.8 | +3.02796 |
| 5 | 96 | I. L. | 1 52 30.20 | 2.15518 | 70.64 | +12 17 45.3 | +3.00475 |
| 6 | 97 | I. U. | 2 21 20.75 | 2.16295 | 71.32 | +15 32 52.9 | +2.97192 |
| 6 | 97 | I. L. | 2 50 44.11 | 2.17140 | 72.07 | +18 31 35.0 | +2.92788 |
| 7 | 98 | I. U. | 3 20 42.07 | 2.17969 | 72.83 | +21 10 40.2 | +2.87017 |
| 7 | 98 | I. L. | 3 51 12.95 | 2.18704 | 73.51 | +23 27 22.2 | +2.79491 |
| 8 | 99 | I. U. | 4 22 11.37 | 2.19257 | 74.03 | +25 19 26.5 | +2.69531 |
| 8 | 99 | I. L. | 4 53 28.14 | 2.19548 | 74.32 | +26 45 16.2 | +2.55847 |
| 9 | 100 | I. U. | 5 24 51.09 | 2.19529 | 74.34 | +27 43 58.4 | +2.35257 |
| 9 | 100 | I. L. | 5 56 6.05 | 2.19173 | 74.06 | +28 15 25.1 | +1.95328 |
| 10 | 101 | I. U. | 6 26 58.43 | 2.18480 | 73.46 | +28 20 12.4 | —1.61066 |
| 10 | 101 | I. L. | 6 57 14.77 | 2.17473 | 72.58 | +27 59 35.2 | —2.21511 |
| 11 | 102 | I. U. | 7 26 43.94 | 2.16203 | 71.48 | +27 15 17.7 | —2.44279 |
| 11 | 102 | I. L. | 7 55 18.05 | 2.14734 | 70.23 | +26 9 25.0 | —2.57933 |
| 12 | 103 | I. U. | 8 22 52.74 | 2.13146 | 68.90 | +24 44 12.0 | —2.67265 |
| 12 | 103 | I. L. | 8 49 26.73 | 2.11511 | 67.55 | +23 1 55.3 | —2.74060 |
| 13 | 104 | I. U. | 9 15 2.33 | 2.09895 | 66.24 | +21 4 47.6 | —2.79183 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| April 13 | 104 | I. L. | 9 39 42.79 | 2.08361 | 65.01 | +18 54 53.6 | —2.83129 |
| 14 | 105 | I. U. | 10 3 33.84 | 2.06963 | 63.90 | +16 34 8.8 | —2.86207 |
| 14 | 105 | I. L. | 10 26 41.99 | 2.05725 | 62.94 | +14 4 18.4 | —2.88610 |
| 15 | 106 | I. U. | 10 49 14.50 | 2.04600 | 62.14 | +11 26 58.3 | —2.90466 |
| 15 | 106 | I. L. | 11 11 18.89 | 2.03910 | 61.52 | + 8 43 37.8 | —2.91871 |
| 16 | 107 | I. U. | 11 33 2.96 | 2.03362 | 61.09 | + 5 55 40.9 | —2.92891 |
| 16 | 107 | I. L. | 11 54 34.60 | 2.03072 | 60.85 | + 3 4 27.6 | —2.93556 |
| 17 | 108 | I. U. | 12 16 1.67 | 2.03048 | 60.81 | + 0 11 17.0 | —2.93882 |
| 17 | 109 | I. L. | 12 37 32.06 | 2.03298 | 60.97 | — 2 42 30.8 | —2.93867 |
| 18 | 109 | I. U. | 12 59 13.68 | 2.03802 | 61.32 | — 5 35 33.4 | —2.93495 |
| 18 | 110 | I. L. | 13 21 14.31 | 2.04556 | 61.86 | — 8 26 23.9 | —2.92742 |
| 19 | 110 | I. U. | 13 43 41.71 | 2.05538 | 62.59 | —11 13 28.8 | —2.91551 |
| 20 | 111 | II. L. | 14 8 50.36 | 2.06793 | 63.48 | —13 55 6.7 | —2.89845 |
| 20 | 111 | II. U. | 14 32 35.58 | 2.08167 | 64.53 | —16 29 27.6 | —2.87523 |
| 21 | 112 | II. L. | 14 57 9.01 | 2.09674 | 65.72 | —18 54 32.2 | —2.84429 |
| 21 | 112 | II. U. | 15 22 35.91 | 2.11257 | 67.00 | —21 8 11.3 | —2.80339 |
| 22 | 113 | II. L. | 15 49 0.15 | 2.12859 | 68.32 | —23 8 7.4 | —2.74927 |
| 22 | 113 | II. U. | 16 16 23.38 | 2.14420 | 69.63 | —24 51 57.7 | —2.67669 |
| 23 | 114 | II. L. | 16 44 44.43 | 2.15857 | 70.87 | —26 17 18.0 | —2.57576 |
| 23 | 114 | II. U. | 17 13 58.99 | 2.17099 | 71.98 | —27 21 49.3 | —2.42635 |
| 24 | 115 | II. L. | 17 43 59.24 | 2.18031 | 72.88 | —28 3 26.3 | —2.16967 |
| 24 | 115 | II. U. | 18 14 34.11 | 2.18752 | 73.50 | —28 20 25.3 | —1.32634 |
| 25 | 116 | II. L. | 18 45 30.26 | 2.19078 | 73.82 | —28 11 34.4 | +2.04179 |
| 25 | 116 | II. U. | 19 16 33.04 | 2.19061 | 73.85 | —27 36 18.1 | +2.38489 |
| 26 | 117 | II. L. | 19 47 28.26 | 2.18729 | 73.60 | —26 34 41.4 | +2.57159 |
| 26 | 117 | II. U. | 20 18 3.56 | 2.18133 | 73.10 | —25 7 28.5 | +2.69723 |
| 27 | 118 | II. L. | 20 48 9.53 | 2.17342 | 72.41 | —23 15 59.1 | +2.78902 |
| 27 | 118 | II. U. | 21 17 40.46 | 2.16441 | 71.63 | —21 2 1.7 | +2.85878 |
| 28 | 119 | II. L. | 21 46 34.30 | 2.15521 | 70.84 | —18 27 46.9 | +2.91270 |
| 28 | 119 | II. U. | 22 14 52.42 | 2.14653 | 70.09 | —15 35 42.0 | +2.95453 |
| 29 | 120 | II. L. | 22 42 39.07 | 2.13909 | 69.44 | —12 28 26.8 | +2.98655 |
| 29 | 120 | II. U. | 23 10 0.73 | 2.13351 | 68.94 | — 9 8 51.7 | +3.01021 |
| 30 | 121 | II. L. | 23 37 5.58 | 2.13017 | 68.63 | — 5 39 55.2 | +3.02649 |
| 30 | 122 | II. U. | 0 4 2.82 | 2.12943 | 68.54 | — 2 4 44.7 | +3.03587 |
| May 1 | 122 | II. L. | 0 31 2.30 | 2.13139 | 68.67 | + 1 33 23.1 | +3.03838 |
| 1 | 123 | II. U. | 0 58 14.03 | 2.13599 | 69.02 | + 5 11 2.7 | +3.03391 |
| 2 | 123 | II. L. | 1 25 47.66 | 2.14292 | 69.57 | + 8 44 40.2 | +3.02197 |
| 2 | 124 | II. U. | 1 53 52.09 | 2.15186 | 70.29 | +12 10 35.3 | +3.00182 |
| 3 | 124 | II. L. | 2 22 34.63 | 2.16221 | 71.15 | +15 25 4.2 | +2.97202 |
| 3 | 125 | I. U. | 2 49 36.24 | 2.17278 | 72.09 | +18 24 25.0 | +2.93085 |
| 4 | 125 | I. L. | 3 19 45.28 | 2.18361 | 73.03 | +21 5 4.1 | +2.87558 |
| 5 | 126 | I. U. | 3 50 37.71 | 2.19324 | 73.89 | +23 23 46.0 | +2.80188 |
| 5 | 126 | I. L. | 4 22 7.30 | 2.20069 | 74.58 | +25 17 43.8 | +2.70252 |
| 6 | 127 | I. U. | 4 54 3.25 | 2.20515 | 75.01 | +26 44 50.6 | +2.56336 |
| 6 | 127 | I. L. | 5 26 11.01 | 2.20593 | 75.11 | +27 43 48.7 | +2.34928 |
| 7 | 128 | I. U. | 5 58 13.43 | 2.20268 | 74.85 | +28 14 15.6 | +1.91116 |
| 7 | 128 | I. L. | 6 29 52.74 | 2.19543 | 74.24 | +28 16 43.7 | —1.74507 |
| 8 | 129 | I. U. | 7 0 52.68 | 2.18458 | 73.31 | +27 52 35.9 | —2.26505 |
| 8 | 129 | I. L. | 7 31 0.04 | 2.17067 | 72.13 | +27 3 49.7 | —2.47929 |
| 9 | 130 | I. U. | 8 0 5.68 | 2.15451 | 70.77 | +25 52 51.0 | —2.60863 |

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| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| May 9 | 130 | I. L. | 8 28 4.83 | 2.13704 | 69.32 | +24 22 15.9 | −2.69679 |
| 10 | 131 | I. U. | 8 54 56.64 | 2.11912 | 67.86 | +22 34 40.1 | −2.76057 |
| 10 | 131 | I. L. | 9 20 43.57 | 2.10147 | 66.45 | +20 32 33.2 | −2.80821 |
| 11 | 132 | I. U. | 9 45 30.56 | 2.08483 | 65.14 | +18 18 12.3 | −2.84442 |
| 11 | 132 | I. L. | 10 9 24.11 | 2.06982 | 63.98 | +15 53 40.2 | −2.87216 |
| 12 | 133 | I. U. | 10 32 31.95 | 2.05679 | 62.99 | +13 20 46.1 | −2.89354 |
| 12 | 133 | I. L. | 10 55 2.32 | 2.04614 | 62.18 | +10 41 7.6 | −2.90988 |
| 13 | 134 | I. U. | 11 17 3.80 | 2.03806 | 61.56 | + 7 56 11.4 | −2.92205 |
| 13 | 134 | I. L. | 11 38 45.03 | 2.03278 | 61.15 | + 5 7 17.6 | −2.93059 |
| 14 | 135 | I. U. | 12 0 14.71 | 2.03032 | 60.94 | + 2 15 41.4 | −2.93591 |
| 14 | 136 | I. L. | 12 21 41.45 | 2.03080 | 60.94 | − 0 37 23.7 | −2.93807 |
| 15 | 136 | I. U. | 12 43 13.87 | 2.03415 | 61.15 | − 3 30 43.3 | −2.93707 |
| 15 | 137 | I. L. | 13 5 0.51 | 2.04022 | 61.57 | − 6 22 59.4 | −2.93268 |
| 16 | 137 | I. U. | 13 27 9.82 | 2.04906 | 62.18 | − 9 12 47.5 | −2.92443 |
| 16 | 138 | I. L. | 13 49 50.15 | 2.06024 | 62.98 | −11 58 35.4 | −2.91174 |
| 17 | 138 | I. U. | 14 13 9.52 | 2.07353 | 63.96 | −14 38 40.1 | −2.89371 |
| 17 | 139 | I. L. | 14 37 15.40 | 2.08856 | 65.10 | −17 11 6.4 | −2.86900 |
| 18 | 139 | I. U. | 15 2 14.49 | 2.10479 | 66.36 | −19 33 47.1 | −2.83582 |
| 18 | 140 | I. L. | 15 28 12.06 | 2.12169 | 67.69 | −21 44 22.9 | −2.79148 |
| 19 | 140 | II. U. | 15 57 29.46 | 2.13915 | 69.05 | −23 40 28.9 | −2.73183 |
| 20 | 141 | II. L. | 16 25 33.68 | 2.15500 | 70.38 | −25 19 14.5 | −2.65011 |
| 20 | 141 | II. U. | 16 54 37.13 | 2.16909 | 71.60 | −26 38 20.3 | −2.53390 |
| 21 | 142 | II. L. | 17 24 32.92 | 2.18061 | 72.63 | −27 35 16.7 | −2.35353 |
| 21 | 142 | II. U. | 17 55 10.38 | 2.18890 | 73.40 | −28 7 59.6 | −2.00087 |
| 22 | 143 | II. L. | 18 26 15.52 | 2.19351 | 73.86 | −28 14 56.8 | +1.49693 |
| 22 | 143 | II. U. | 18 57 32.36 | 2.19432 | 73.98 | −27 55 16.4 | +2.21854 |
| 23 | 144 | II. L. | 19 28 44.53 | 2.19142 | 73.77 | −27 8 51.8 | +2.47436 |
| 23 | 144 | II. U. | 19 59 37.10 | 2.18532 | 73.28 | −25 56 22.1 | +2.62910 |
| 24 | 145 | II. L. | 20 29 58.14 | 2.17661 | 72.57 | −24 19 7.3 | +2.73656 |
| 24 | 145 | II. U. | 20 59 39.40 | 2.16625 | 71.71 | −22 18 59.3 | +2.81571 |
| 25 | 146 | II. L. | 21 28 37.04 | 2.15518 | 70.79 | −19 58 14.1 | +2.87576 |
| 25 | 146 | II. U. | 21 56 51.00 | 2.14429 | 69.89 | −17 19 21.5 | +2.92184 |
| 26 | 147 | II. L. | 22 24 24.56 | 2.13440 | 69.07 | −14 24 59.5 | +2.95718 |
| 26 | 147 | II. U. | 22 51 23.68 | 2.12618 | 68.39 | −11 17 49.7 | +2.98376 |
| 27 | 148 | II. L. | 23 17 56.27 | 2.12008 | 67.89 | − 8 0 34.8 | +3.00303 |
| 27 | 148 | II. U. | 23 44 11.56 | 2.11667 | 67.60 | − 4 35 58.5 | +3.01569 |
| 28 | 149 | II. L. | 0 10 19.69 | 2.11611 | 67.53 | − 1 6 46.8 | +3.02230 |
| 28 | 150 | II. U. | 0 36 31.09 | 2.11856 | 67.69 | + 2 24 10.2 | +3.02296 |
| 29 | 150 | II. L. | 1 2 56.53 | 2.12385 | 68.08 | + 5 53 56.9 | +3.01741 |
| 29 | 151 | II. U. | 1 29 46.31 | 2.13171 | 68.69 | + 9 19 30.0 | +3.00514 |
| 30 | 151 | II. L. | 1 57 9.97 | 2.14179 | 69.49 | +12 37 37.2 | +2.98520 |
| 30 | 152 | II. U. | 2 25 15.64 | 2.15354 | 70.44 | +15 44 59.1 | +2.95626 |
| 31 | 152 | II. L. | 2 58 69.32 | 2.16610 | 71.47 | +18 38 10.9 | +2.91635 |
| 31 | 153 | II. U. | 3 28 54.00 | 2.17854 | 72.52 | +21 13 48.1 | +2.86249 |
| June 1 | 153 | II. L. | 3 54 28.77 | 2.18994 | 73.50 | +23 28 35.0 | +2.79007 |
| 1 | 154 | II. U. | 4 25 48.07 | 2.19923 | 74.31 | +25 19 35.2 | +2.69135 |
| 2 | 154 | I. L. | 4 55 11.64 | 2.20523 | 74.86 | +26 44 25.0 | +2.55108 |
| 3 | 155 | I. U. | 5 27 23.51 | 2.20769 | 75.08 | +27 41 26.3 | +2.33062 |
| 3 | 155 | I. L. | 5 59 37.06 | 2.20591 | 74.93 | +28 9 55.7 | +1.85246 |
| 4 | 156 | I. U. | 6 31 33.04 | 2.19981 | 74.40 | +28 10 8.1 | −1.83251 |

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|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| June 4 | 156 | I. L. | 7 2 53.27 | 2.18963 | 73.52 | +27 43 14.3 | —2.29929 |
| 5 | 157 | I. U. | 7 33 22.54 | 2.17600 | 72.36 | +26 51 10.7 | —2.50406 |
| 5 | 157 | I. L. | 8 2 49.94 | 2.15981 | 71.01 | +25 36 24.9 | —2.62951 |
| 6 | 158 | I. U. | 8 31 9.36 | 2.14201 | 69.56 | +24 1 41.0 | —2.71517 |
| 6 | 158 | I. L. | 8 58 19.08 | 2.12362 | 68.08 | +22 9 46.6 | —2.77663 |
| 7 | 159 | I. U. | 9 24 21.08 | 2.10541 | 66.64 | +20 3 23.6 | —2.82204 |
| 7 | 159 | I. L. | 9 49 20.09 | 2.08803 | 65.31 | +17 45 0.6 | —2.85612 |
| 8 | 160 | I. U. | 10 13 22.85 | 2.07218 | 64.12 | +15 16 51.1 | —2.88184 |
| 8 | 160 | I. L. | 10 36 37.32 | 2.05850 | 63.09 | +12 40 52.8 | —2.90113 |
| 9 | 161 | I. U. | 10 59 12.07 | 2.04724 | 62.26 | + 9 58 48.7 | —2.91540 |
| 9 | 161 | I. L. | 11 21 16.14 | 2.03866 | 61.64 | + 7 12 9.0 | —2.92557 |
| 10 | 162 | I. U. | 11 42 58.67 | 2.03302 | 61.23 | + 4 22 14.7 | —2.93222 |
| 10 | 163 | I. L. | 12 4 28.80 | 2.03336 | 61.03 | + 1 30 19.8 | —2.93576 |
| 11 | 163 | I. U. | 12 25 55.65 | 2.03080 | 61.04 | — 1 22 24.3 | —2.93636 |
| 11 | 164 | I. L. | 12 47 28.35 | 2.03431 | 61.28 | — 4 14 47.8 | —2.93399 |
| 12 | 164 | I. U. | 13 9 15.99 | 2.04076 | 61.73 | — 7 5 37.0 | —2.92840 |
| 12 | 165 | I. L. | 13 31 27.61 | 2.05007 | 62.39 | — 9 53 32.9 | —2.91913 |
| 13 | 165 | I. U. | 13 54 12.20 | 2.06194 | 63.25 | —12 37 8.3 | —2.90547 |
| 13 | 166 | I. L. | 14 17 38.45 | 2.07609 | 64.28 | —15 14 43.4 | —2.88643 |
| 14 | 166 | I. U. | 14 41 54.55 | 2.09216 | 65.47 | —17 44 25.6 | —2.86052 |
| 14 | 167 | I. L. | 15 7 7.81 | 2.10948 | 66.80 | —20 4 6.8 | —2.82575 |
| 15 | 167 | I. U. | 15 33 24.09 | 2.12743 | 68.22 | —22 11 24.7 | —2.77902 |
| 15 | 168 | I. L. | 16 0 47.06 | 2.14526 | 69.66 | —24 3 42.7 | —2.71550 |
| 16 | 168 | I. U. | 16 29 17.27 | 2.16211 | 71.05 | —25 38 15.6 | —2.62706 |
| 16 | 169 | I. L. | 16 58 51.44 | 2.17705 | 72.31 | —26 52 17.7 | —2.49748 |
| 17 | 169 | I. U. | 17 29 21.88 | 2.18912 | 73.35 | —27 43 13.2 | —2.28533 |
| 18 | 170 | II. L. | 18 3 4.60 | 2.19789 | 74.10 | —28 8 48.5 | —1.79029 |
| 18 | 170 | II. U. | 18 34 48.10 | 2.20213 | 74.50 | —28 7 28.2 | +1.87910 |
| 19 | 171 | II. L. | 19 6 40.83 | 2.20211 | 74.53 | —27 38 23.9 | +2.33224 |
| 19 | 171 | II. U. | 19 38 24.42 | 2.19802 | 74.20 | —26 41 41.2 | +2.54580 |
| 20 | 172 | II. L. | 20 9 42.47 | 2.19050 | 73.57 | —25 18 19.3 | +2.68205 |
| 20 | 172 | II. U. | 20 40 22.17 | 2.18027 | 72.73 | —23 30 2.9 | +2.77808 |
| 21 | 173 | II. L. | 21 10 15.25 | 2.16838 | 71.75 | —21 19 13.8 | +2.84880 |
| 21 | 173 | II. U. | 21 39 18.14 | 2.15579 | 70.72 | —18 48 36.6 | +2.90184 |
| 22 | 174 | II. L. | 22 7 31.56 | 2.14351 | 69.73 | —16 1 8.1 | +2.94171 |
| 22 | 174 | II. U. | 22 34 59.64 | 2.13236 | 68.83 | —12 59 49.3 | +2.97132 |
| 23 | 175 | II. L. | 23 1 49.23 | 2.12307 | 68.08 | — 9 47 39.4 | +2.99255 |
| 23 | 175 | II. U. | 23 28 9.00 | 2.11618 | 67.53 | — 6 27 33.3 | +3.00668 |
| 24 | 176 | II. L. | 23 54 8.72 | 2.11203 | 67.21 | — 3 2 20.7 | +3.01460 |
| 24 | 177 | II. U. | 0 19 58.97 | 2.11089 | 67.13 | + 0 25 13.6 | +3.01670 |
| 25 | 177 | II. L. | 0 45 50.55 | 2.11277 | 67.28 | + 3 52 26.6 | +3.01313 |
| 25 | 178 | II. U. | 1 11 54.21 | 2.11757 | 67.66 | + 7 16 35.1 | +3.00363 |
| 26 | 178 | II. L. | 1 38 20.32 | 2.12509 | 68.25 | +10 34 53.3 | +2.98776 |
| 26 | 179 | II. U. | 2 5 18.43 | 2.13488 | 69.02 | +13 44 31.6 | +2.96459 |
| 27 | 179 | II. L. | 2 32 56.64 | 2.14631 | 69.98 | +16 42 35.3 | +2.93268 |
| 27 | 180 | II. U. | 3 1 21.31 | 2.15863 | 70.94 | +19 26 5.7 | +2.88997 |
| 28 | 180 | II. L. | 3 30 35.60 | 2.17105 | 71.97 | +21 52 3.8 | +2.83321 |
| 28 | 181 | II. U. | 4 0 39.17 | 2.18259 | 72.98 | +23 57 36.2 | +2.75747 |
| 29 | 181 | II. L. | 4 31 27.30 | 2.19218 | 73.73 | +25 40 3.8 | +2.65389 |
| 29 | 182 | II. U. | 5 2 50.55 | 2.19885 | 74.29 | +26 57 13.7 | +2.50474 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
|  | d. |  | h. m. s. |  | s. | ° ′ ″ |  |
| June 30 | 182 | II. L. | 5 34 35.16 | 2.20181 | 74.55 | +27 47 31.4 | +2.26150 |
| 30 | 183 | II. U. | 6 6 24.14 | 2.20071 | 74.43 | +28 10 9.9 | +1.64081 |
| July 1 | 183 | II. L. | 6 37 59.07 | 2.19540 | 73.96 | +28 5 15.5 | —1.96487 |
| 2 | 184 | I. U. | 7 6 35.96 | 2.18653 | 73.14 | +27 33 47.8 | —2.34410 |
| 2 | 184 | I. L. | 7 36 54.42 | 2.17386 | 72.05 | +26 37 31.1 | —2.53100 |
| 3 | 185 | I. U. | 8 6 15.21 | 2.15866 | 70.75 | +25 18 43.8 | —2.64916 |
| 3 | 185 | I. L. | 8 34 31.54 | 2.14167 | 69.34 | +23 40 4.2 | —2.73102 |
| 4 | 186 | I. U. | 9 1 40.77 | 2.12379 | 67.90 | +21 44 18.3 | —2.79017 |
| 4 | 186 | I. L. | 9 27 44.12 | 2.10595 | 66.51 | +19 34 8.6 | —2.83403 |
| 5 | 187 | I. U. | 9 52 45.63 | 2.08888 | 65.21 | +17 12 8.0 | —2.86662 |
| 5 | 187 | I. L. | 10 16 51.41 | 2.07321 | 64.04 | +14 40 36.3 | —2.89085 |
| 6 | 188 | I. U. | 10 40 8.98 | 2.05949 | 63.04 | +12 1 37.1 | —2.90870 |
| 6 | 188 | I. L. | 11 2 46.50 | 2.04809 | 62.22 | + 9 16 59.7 | —2.92140 |
| 7 | 189 | I. U. | 11 24 52.78 | 2.03929 | 61.60 | + 6 28 20.7 | —2.92988 |
| 7 | 189 | I. L. | 11 46 36.71 | 2.03334 | 61.20 | + 3 37 5.7 | —2.93474 |
| 8 | 190 | I. U. | 12 8 7.36 | 2.03040 | 61.02 | + 0 44 32.5 | —2.93683 |
| 8 | 191 | I. L. | 12 29 33.84 | 2.03056 | 61.05 | — 2 8 8.0 | —2.93535 |
| 9 | 191 | I. U. | 12 51 5.24 | 2.03375 | 61.29 | — 4 59 44.0 | —2.93113 |
| 9 | 192 | I. L. | 13 12 50.73 | 2.03993 | 61.74 | — 7 49 4.4 | —2.92382 |
| 10 | 192 | I. U. | 13 34 59.43 | 2.04902 | 62.41 | —10 34 54.2 | —2.91281 |
| 10 | 193 | I. L. | 13 57 40.55 | 2.06081 | 63.28 | —13 15 50.5 | —2.89757 |
| 11 | 193 | I. U. | 14 21 3.03 | 2.07493 | 64.34 | —15 50 19.5 | —2.87707 |
| 11 | 194 | I. L. | 14 45 15.42 | 2.09107 | 65.57 | —18 16 35.4 | —2.84971 |
| 12 | 194 | I. U. | 15 10 25.55 | 2.10870 | 66.93 | —20 32 37.0 | —2.81339 |
| 12 | 195 | I. L. | 15 36 39.88 | 2.12707 | 68.37 | —22 36 6.1 | —2.76492 |
| 13 | 195 | I. U. | 16 4 2.83 | 2.14566 | 69.85 | —24 24 31.3 | —2.69890 |
| 13 | 196 | I. L. | 16 32 35.93 | 2.16319 | 71.30 | —25 55 8.1 | —2.60619 |
| 14 | 196 | I. U. | 17 2 16.19 | 2.17903 | 72.62 | —27 5 7.0 | —2.46804 |
| 14 | 197 | I. L. | 17 32 57.24 | 2.19209 | 73.72 | —27 51 46.5 | —2.23262 |
| 15 | 197 | I. U. | 18 4 26.91 | 2.20164 | 74.53 | —28 12 44.0 | —1.57027 |
| 15 | 198 | I. L. | 18 36 29.61 | 2.20707 | 74.99 | —28 6 9.8 | +2.01529 |
| 16 | 198 | I. U. | 19 8 46.47 | 2.20806 | 75.06 | —27 31 6.4 | +2.39278 |
| 16 | 199 | I. L. | 19 40 58.31 | 2.20485 | 74.76 | —26 27 30.4 | +2.58904 |
| 17 | 199 | II. U. | 20 15 15.87 | 2.19761 | 74.15 | —24 56 17.7 | +2.71794 |
| 18 | 200 | II. L. | 20 46 26.58 | 2.18766 | 73.30 | —22 59 18.2 | +2.80982 |
| 18 | 200 | II. U. | 21 16 50.78 | 2.17586 | 72.30 | —20 39 5.1 | +2.87747 |
| 19 | 201 | II. L. | 21 46 24.13 | 2.16328 | 71.25 | —17 58 40.9 | +2.92787 |
| 19 | 201 | II. U. | 22 15 6.77 | 2.15085 | 70.24 | —15 1 25.5 | +2.96503 |
| 20 | 202 | II. L. | 22 43 2.58 | 2.13953 | 69.34 | —11 50 45.6 | +2.99170 |
| 20 | 202 | II. U. | 23 10 18.56 | 2.12995 | 68.59 | — 8 30 5.9 | +3.00975 |
| 21 | 203 | II. L. | 23 37 2.86 | 2.12267 | 68.02 | — 5 2 46.8 | +3.02026 |
| 21 | 204 | II. U. | 0 3 25.52 | 2.11813 | 67.68 | — 1 32 0.6 | +3.02419 |
| 22 | 204 | II. L. | 0 29 36.98 | 2.11654 | 67.58 | + 1 59 11.2 | +3.02207 |
| 22 | 205 | II. U. | 0 55 47.83 | 2.11787 | 67.70 | + 5 27 52.3 | +3.01384 |
| 23 | 205 | II. L. | 1 22 8.64 | 2.12199 | 68.04 | + 8 51 13.3 | +2.99942 |
| 23 | 206 | II. U. | 1 48 49.22 | 2.12863 | 68.59 | +12 6 27.6 | +2.97834 |
| 24 | 206 | II. L. | 2 15 58.50 | 2.13729 | 69.32 | +15 10 52.2 | +2.94956 |
| 24 | 207 | II. U. | 2 43 43.75 | 2.14749 | 70.15 | +18 1 43.5 | +2.91161 |
| 25 | 207 | II. L. | 3 12 10.18 | 2.15845 | 71.05 | +20 35 21.4 | +2.86229 |
| 25 | 208 | II. U. | 3 41 20.42 | 2.16929 | 71.97 | +22 52 10.9 | +2.79786 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| July 26 | 208 | II. L. | 4 11 13.05 | 2.17909 | 72.81 | +24 46 44.7 | +2.71257 |
| 26 | 209 | II. U. | 4 41 42.94 | 2.18698 | 73.47 | +26 17 53.8 | +2.59555 |
| 27 | 209 | II. L. | 5 12 40.90 | 2.19215 | 73.88 | +27 23 54.1 | +2.42312 |
| 27 | 210 | II. U. | 5 43 54.10 | 2.19410 | 74.00 | +28 3 36.4 | +2.11951 |
| 28 | 210 | II. L. | 6 15 7.02 | 2.19204 | 73.80 | +28 16 33.3 | —0.30049 |
| | | | | | | | |
| 28 | 211 | II. U. | 6 46 3.44 | 2.18632 | 73.26 | +28 3 3.6 | —2.12104 |
| 29 | 211 | II. L. | 7 16 27.80 | 2.17696 | 72.42 | +27 24 9.4 | —2.41455 |
| 29 | 212 | II. U. | 7 46 7.03 | 2.16465 | 71.33 | +26 21 32.7 | —2.56695 |
| 30 | 212 | II. L. | 8 14 51.65 | 2.15002 | 70.08 | +24 57 21.4 | —2.67279 |
| 31 | 213 | II. U. | 8 42 35.93 | 2.13389 | 68.73 | +23 14 3.7 | —2.74814 |
| | | | | | | | |
| 31 | 213 | I. L. | 9 7 3.22 | 2.11774 | 67.36 | +21 14 14.6 | —2.80346 |
| Aug. 1 | 214 | I. U. | 9 32 46.88 | 2.10099 | 66.04 | +19 0 28.4 | —2.84487 |
| 1 | 214 | I. L. | 9 57 33.18 | 2.08504 | 64.81 | +16 35 11.2 | —2.87578 |
| 2 | 215 | I. U. | 10 21 27.71 | 2.07033 | 63.71 | +14 0 39.8 | —2.89881 |
| 2 | 215 | I. L. | 10 44 37.26 | 2.05740 | 62.77 | +11 18 58.2 | —2.91554 |
| | | | | | | | |
| 3 | 216 | I. U. | 11 7 9.47 | 2.04669 | 62.01 | + 8 31 58.2 | —2.92707 |
| 3 | 216 | I. L. | 11 29 12.37 | 2.03842 | 61.44 | + 5 41 19.2 | —2.93442 |
| 4 | 217 | I. U. | 11 50 54.35 | 2.03282 | 61.07 | + 2 48 32.2 | —2.93789 |
| 4 | 218 | I. L. | 12 12 23.73 | 2.03007 | 60.91 | — 0 5 0.4 | —2.93827 |
| 5 | 218 | I. U. | 12 33 49.34 | 2.03019 | 60.96 | — 2 58 1.8 | —2.93537 |
| | | | | | | | |
| 5 | 219 | I. L. | 12 55 19.57 | 2.03318 | 61.21 | — 5 49 18.2 | —2.92935 |
| 6 | 219 | I. U. | 13 17 3.13 | 2.03914 | 61.67 | — 8 37 34.9 | —2.91995 |
| 6 | 220 | I. L. | 13 39 8.77 | 2.04782 | 62.33 | —11 21 36.3 | —2.90712 |
| 7 | 220 | I. U. | 14 1 45. 9 | 2.05896 | 63.19 | —14 0 0.8 | —2.88956 |
| 7 | 221 | I. L. | 14 25 0.69 | 2.07251 | 64.23 | —16 31 18.3 | —2.86687 |
| | | | | | | | |
| 8 | 221 | I. U. | 14 49 3.75 | 2.08796 | 65.43 | —18 53 48.8 | —2.83727 |
| 8 | 222 | I. L. | 15 14 1.86 | 2.10486 | 66.76 | —21 5 39.5 | —2.79862 |
| 9 | 222 | I. U. | 15 40 1.31 | 2.12271 | 68.19 | —23 4 42.6 | —2.74776 |
| 9 | 223 | I. L. | 16 7 6.73 | 2.14073 | 69.65 | —24 48 38.0 | —2.67910 |
| 10 | 223 | I. U. | 16 35 19.77 | 2.15806 | 71.08 | —26 14 53.3 | —2.58287 |
| | | | | | | | |
| 10 | 224 | I. L. | 17 4 39. 8 | 2.17386 | 72.41 | —27 20 51.0 | —2.43876 |
| 11 | 224 | I. U. | 17 34 58.79 | 2.18724 | 73.55 | —28 3 55.2 | —2.18784 |
| 11 | 225 | I. L. | 18 6 8.98 | 2.19753 | 74.41 | —28 21 46.2 | —1.35787 |
| 12 | 225 | I. U. | 18 37 55.61 | 2.20396 | 74.94 | —28 12 30.3 | +2.06582 |
| 12 | 226 | I. L. | 19 10 1.85 | 2.20642 | 75.11 | —27 34 59.2 | +2.41378 |
| | | | | | | | |
| 13 | 226 | I. U. | 19 42 9.79 | 2.20480 | 74.93 | —26 28 49.7 | +2.60389 |
| 13 | 227 | I. L. | 20 14 2.71 | 2.19962 | 74.44 | —24 54 39.6 | +2.73141 |
| 14 | 227 | I. U. | 20 45 26.55 | 2.19167 | 73.71 | —22 53 59.1 | +2.82353 |
| 14 | 228 | I. L. | 21 16 11.54 | 2.18139 | 72.82 | —20 29 5.6 | +2.89223 |
| 15 | 228 | I. U. | 21 46 12.31 | 2.17079 | 71.88 | —17 42 54.8 | +2.94382 |
| | | | | | | | |
| 16 | 229 | II. L. | 22 17 49.98 | 2.15939 | 70.96 | —14 38 47.8 | +2.98198 |
| 16 | 229 | II. U. | 22 46 21.82 | 2.14937 | 70.13 | —11 20 22.1 | +3.00935 |
| 17 | 230 | II. L. | 23 14 17.55 | 2.14098 | 69.45 | — 7 51 21.2 | +3.02740 |
| 17 | 230 | II. U. | 23 41 45.04 | 2.13513 | 68.96 | — 4 15 30.3 | +3.03751 |
| 18 | 231 | II. L. | 0 8 53.50 | 2.13098 | 68.68 | — 0 36 29.4 | +3.04027 |
| | | | | | | | |
| 18 | 232 | II. U. | 0 35 52.83 | 2.12979 | 68.62 | + 3 2 7.3 | +3.03589 |
| 19 | 232 | II. L. | 1 2 53.08 | 2.13139 | 68.78 | + 6 36 55.4 | +3.02483 |
| 19 | 233 | II. U. | 1 30 4.08 | 2.13551 | 69.15 | +10 4 38.6 | +3.00671 |
| 20 | 233 | II. L. | 1 57 34.62 | 2.14170 | 69.70 | +13 22 8.9 | +2.98088 |
| 20 | 234 | II. U. | 2 25 32.40 | 2.14968 | 70.39 | +16 26 28.1 | +2.94639 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Aug. 21 | 234 | II. L. | 2 54 3.84 | 2.15872 | 71.17 | +19 14 49.3 | +2.90162 |
| 21 | 235 | II. U. | 3 23 11.69 | 2.16794 | 71.98 | +21 44 31.7 | +2.84365 |
| 22 | 235 | II. L. | 3 52 56.44 | 2.17667 | 72.74 | +23 53 10.8 | +2.76862 |
| 22 | 236 | II. U. | 4 23 14.84 | 2.18410 | 73.38 | +25 38 40.7 | +2.66890 |
| 23 | 236 | II. L. | 4 53 59.84 | 2.18896 | 73.88 | +26 59 20.5 | +2.53034 |
| | | | | | | | |
| 23 | 237 | II. U. | 5 25 0.93 | 2.19142 | 74.02 | +27 54 0.1 | +2.31606 |
| 24 | 237 | II. L. | 5 56 4.93 | 2.19044 | 73.92 | +28 22 5.1 | +1.86862 |
| 24 | 238 | II. U. | 6 26 57.15 | 2.18597 | 73.49 | +28 23 43.5 | −1.75509 |
| 25 | 238 | II. L. | 6 57 23.13 | 2.17811 | 72.77 | +27 59 42.6 | −2.26061 |
| 25 | 239 | II. U. | 7 27 10.23 | 2.16735 | 71.80 | +27 11 23.8 | −2.47614 |
| | | | | | | | |
| 26 | 239 | II. L. | 7 56 7.99 | 2.15515 | 70.63 | +26 0 39.5 | −2.60877 |
| 26 | 240 | II. U. | 8 24 10.29 | 2.13966 | 69.34 | +24 29 40.7 | −2.70037 |
| 27 | 240 | II. L. | 8 51 13.43 | 2.12313 | 67.99 | +22 40 48.7 | −2.76711 |
| 27 | 241 | II. U. | 9 17 17.46 | 2.10697 | 66.66 | +20 36 28.7 | −2.81704 |
| 28 | 241 | II. L. | 9 42 24.86 | 2.09121 | 65.40 | +18 19 2.7 | −2.85498 |
| | | | | | | | |
| 28 | 242 | II. U. | 10 6 39.98 | 2.07639 | 64.24 | +15 50 45.4 | −2.88359 |
| 29 | 242 | II. L. | 10 30 8.76 | 2.06315 | 63.22 | +13 13 43.9 | −2.90505 |
| 30 | 243 | I. U. | 10 50 53.15 | 2.05223 | 62.36 | +10 29 54.8 | −2.92062 |
| 30 | 243 | I. L. | 11 13 11.34 | 2.04285 | 61.66 | + 7 41 5.5 | −2.93136 |
| 31 | 244 | I. U. | 11 35 4.40 | 2.03579 | 61.18 | + 4 48 54.7 | −2.93789 |
| | | | | | | | |
| 31 | 244 | I. L. | 11 56 40.27 | 2.03141 | 60.86 | + 1 54 53.5 | −2.94062 |
| Sept. 1 | 245 | I. U. | 12 18 6.67 | 2.02946 | 60.78 | − 0 59 31.9 | −2.93997 |
| 1 | 246 | I. L. | 12 39 31.63 | 2.03031 | 60.85 | − 3 53 0.0 | −2.93586 |
| 2 | 246 | I. U. | 13 1 3.00 | 2.03379 | 61.13 | − 6 44 11.2 | −2.92834 |
| 2 | 247 | I. L. | 13 22 48.69 | 2.03989 | 61.62 | − 9 31 46.3 | −2.91719 |
| | | | | | | | |
| 3 | 247 | I. U. | 13 44 56.67 | 2.04840 | 62.29 | −12 14 23.6 | −2.90200 |
| 3 | 248 | I. L. | 14 7 34.70 | 2.05922 | 63.14 | −14 50 39.0 | −2.88218 |
| 4 | 248 | I. U. | 14 30 50.39 | 2.07207 | 64.17 | −17 18 58.7 | −2.85691 |
| 4 | 249 | I. L. | 14 54 50.94 | 2.08661 | 65.33 | −19 37 44.5 | −2.82504 |
| 5 | 249 | I. U. | 15 19 42.74 | 2.10219 | 66.57 | −21 45 8.1 | −2.78519 |
| | | | | | | | |
| 5 | 250 | I. L. | 15 45 30.93 | 2.11863 | 67.86 | −23 39 9.7 | −2.72705 |
| 6 | 250 | I. U. | 16 12 19.30 | 2.13526 | 69.18 | −25 17 43.4 | −2.65225 |
| 6 | 251 | I. L. | 16 40 8.91 | 2.15100 | 70.51 | −26 38 30.8 | −2.55096 |
| 7 | 251 | I. U. | 17 8 57.63 | 2.16536 | 71.75 | −27 39 14.3 | −2.39707 |
| 7 | 252 | I. L. | 17 38 40.37 | 2.17771 | 72.78 | −28 17 38.9 | −2.12254 |
| | | | | | | | |
| 8 | 252 | I. U. | 18 9 8.37 | 2.18727 | 73.57 | −28 31 43.5 | +0.81954 |
| 8 | 253 | I. L. | 18 40 9.53 | 2.19346 | 74.09 | −28 19 49.3 | +2.10243 |
| 9 | 253 | I. U. | 19 11 29.72 | 2.19629 | 74.29 | −27 40 50.5 | +2.42095 |
| 9 | 254 | I. L. | 19 42 54.19 | 2.19559 | 74.20 | −26 34 20.0 | +2.60260 |
| 10 | 254 | I. U. | 20 14 8.89 | 2.19193 | 73.84 | −25 0 47.4 | +2.72770 |
| | | | | | | | |
| 10 | 255 | I. L. | 20 45 2.17 | 2.18561 | 73.27 | −23 1 9.8 | +2.82027 |
| 11 | 255 | I. U. | 21 15 25.62 | 2.17794 | 72.57 | −20 37 16.5 | +2.89042 |
| 11 | 256 | I. L. | 21 45 14.83 | 2.16926 | 71.88 | −17 51 34.4 | +2.94394 |
| 12 | 256 | I. U. | 22 14 28.88 | 2.16077 | 71.11 | −14 46 56.8 | +2.98448 |
| 12 | 257 | I. L. | 22 43 10.65 | 2.15314 | 70.46 | −11 26 41.0 | +3.01473 |
| | | | | | | | |
| 13 | 257 | I. U. | 23 11 25.25 | 2.14694 | 69.95 | − 7 54 21.9 | +3.03559 |
| 14 | 258 | II. L. | 23 41 39.17 | 2.14289 | 69.62 | − 4 13 45.2 | +3.04821 |
| 14 | 259 | II. U. | 0 9 22.54 | 2.14114 | 69.49 | − 0 28 43.5 | +3.05289 |
| 15 | 259 | II. L. | 0 37 4.37 | 2.14208 | 69.60 | + 3 16 46.6 | +3.05003 |
| 15 | 260 | II. U. | 1 4 54.46 | 2.14526 | 69.92 | + 6 58 50.3 | +3.03949 |

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| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Sept. 16 | 260 | II. L. | 1 33 1.65 | 2.15082 | 70.42 | +10 33 35.8 | +3.02082 |
| 16 | 261 | II. U. | 2 1 44.26 | 2.15809 | 71.09 | +13 57 18.0 | +2.99335 |
| 17 | 261 | II. L. | 2 30 38.69 | 2.16661 | 71.89 | +17 6 23.3 | +2.95578 |
| 17 | 262 | II. U. | 3 0 18.98 | 2.17542 | 72.71 | +19 57 31.9 | +2.90607 |
| 18 | 262 | II. L. | 3 30 36.17 | 2.18429 | 73.52 | +22 27 43.4 | +2.84136 |
| 18 | 263 | II. U. | 4 1 27.80 | 2.19173 | 74.22 | +24 34 22.7 | +2.75641 |
| 19 | 263 | II. L. | 4 32 47.20 | 2.19722 | 74.71 | +26 15 24.5 | +2.64187 |
| 19 | 264 | II. U. | 5 4 24.14 | 2.19987 | 74.94 | +27 29 22.3 | +2.47828 |
| 20 | 264 | II. L. | 5 36 5.23 | 2.19924 | 74.89 | +28 15 32.8 | +2.20737 |
| 20 | 265 | II. U. | 6 7 35.48 | 2.19501 | 74.54 | +28 33 57.0 | +1.37840 |
| 21 | 265 | II. L. | 6 38 39.59 | 2.18727 | 73.86 | +28 25 21.0 | —2.03503 |
| 21 | 266 | II. U. | 7 9 3.82 | 2.17638 | 72.88 | +27 51 7.9 | —2.36530 |
| 22 | 266 | II. L. | 7 38 37.32 | 2.16286 | 71.69 | +26 53 13.0 | —2.53807 |
| 22 | 267 | II. U. | 8 7 12.57 | 2.14749 | 70.34 | +25 33 49.8 | —2.64982 |
| 23 | 267 | II. L. | 8 34 46.01 | 2.13104 | 68.92 | +23 55 23.5 | —2.72892 |
| 23 | 268 | II. U. | 9 1 17.10 | 2.11421 | 67.50 | +22 0 20.4 | —2.78732 |
| 24 | 268 | II. L. | 9 26 48.14 | 2.09767 | 66.13 | +19 51 3.1 | —2.83136 |
| 24 | 269 | II. U. | 9 51 23.61 | 2.08211 | 64.89 | +17 29 46.6 | —2.86504 |
| 25 | 269 | II. L. | 10 15 9.47 | 2.06800 | 63.79 | +14 58 36.2 | —2.89059 |
| 25 | 270 | II. U. | 10 38 12.47 | 2.05565 | 62.83 | +12 19 28.1 | —2.90993 |
| 26 | 270 | II. L. | 11 0 39.86 | 2.04544 | 62.01 | + 9 34 7.5 | —2.92397 |
| 26 | 271 | II. U. | 11 22 39.66 | 2.03763 | 61.39 | + 6 44 13.6 | —2.93364 |
| 27 | 271 | II. L. | 11 44 19.34 | 2.03218 | 60.97 | + 3 51 18.5 | —2.93937 |
| 27 | 272 | II. U. | 12 5 46.72 | 2.02938 | 60.74 | + 0 56 49.8 | —2.94146 |
| 28 | 273 | I. L. | 12 25 8.15 | 2.02867 | 60.70 | — 1 57 48.5 | —2.94017 |
| 29 | 273 | I. U. | 12 46 33.71 | 2.03112 | 60.85 | — 4 51 13.2 | —2.93536 |
| 29 | 274 | I. L. | 13 8 9.42 | 2.03579 | 61.20 | — 7 42 0.8 | —2.92686 |
| 30 | 274 | I. U. | 13 30 2.77 | 2.04289 | 61.75 | —10 28 46.4 | —2.91455 |
| 30 | 275 | I. L. | 13 52 21.07 | 2.05204 | 62.46 | —13 10 2.2 | —2.89757 |
| Oct. 1 | 275 | I. U. | 14 15 11.19 | 2.06352 | 63.31 | —15 44 15.0 | —2.87552 |
| 1 | 276 | I. L. | 14 38 39.80 | 2.07598 | 64.30 | —18 9 47.2 | —2.84702 |
| 2 | 276 | I. U. | 15 2 52.78 | 2.08902 | 65.43 | —20 24 54.1 | —2.81050 |
| 2 | 277 | I. L. | 15 27 55.08 | 2.10483 | 66.62 | —22 27 44.7 | —2.76365 |
| 3 | 277 | I. U. | 15 53 50.17 | 2.11992 | 67.85 | —24 16 21.0 | —2.70226 |
| 3 | 278 | I. L. | 16 20 39.64 | 2.13457 | 69.05 | —25 48 40.4 | —2.62066 |
| 4 | 278 | I. U. | 16 48 22.57 | 2.14823 | 70.18 | —27 2 40.7 | —2.50610 |
| 4 | 279 | I. L. | 17 16 55.48 | 2.16026 | 71.24 | —27 56 20.8 | —2.33082 |
| 5 | 279 | I. U. | 17 46 11.75 | 2.17009 | 72.13 | —28 27 50.9 | —1.99695 |
| 5 | 280 | I. L. | 18 16 2.59 | 2.17708 | 72.74 | —28 35 37.3 | +1.35218 |
| 6 | 280 | I. U. | 18 46 15.29 | 2.18139 | 73.09 | —28 18 28.1 | +2.17464 |
| 6 | 281 | I. L. | 19 16 40.63 | 2.18230 | 73.18 | —27 35 43.3 | +2.44389 |
| 7 | 281 | I. U. | 19 47 3.30 | 2.18054 | 73.02 | —26 27 18.0 | +2.60821 |
| 7 | 282 | I. L. | 20 17 13.54 | 2.17653 | 72.64 | —24 53 37.8 | +2.72436 |
| 8 | 282 | I. U. | 20 47 2.82 | 2.17068 | 72.18 | —22 55 42.4 | +2.81144 |
| 8 | 283 | I. L. | 21 16 25.82 | 2.16376 | 71.52 | —20 35 3.5 | +2.87910 |
| 9 | 283 | I. U. | 21 45 20.41 | 2.15661 | 70.87 | —17 53 37.7 | +2.93212 |
| 9 | 284 | I. L. | 22 13 47.47 | 2.14999 | 70.28 | —14 53 45.6 | +2.97364 |
| 10 | 284 | I. U. | 22 41 51.05 | 2.14426 | 69.82 | —11 38 7.7 | +3.00548 |
| 10 | 285 | I. L. | 23 9 36.32 | 2.14070 | 69.52 | — 8 9 42.5 | +3.02890 |
| 11 | 285 | I. U. | 23 37 11.75 | 2.13912 | 69.39 | — 4 31 45.6 | +3.04442 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Oct. 11 | 286 | I. L. | 0 4 46.00 | 2.14004 | 69.45 | — 0 47 48.5 | +3.05269 |
| 12 | 287 | I. U. | 0 32 28.70 | 2.14349 | 69.73 | + 2 58 24.1 | +3.05358 |
| 12 | 287 | I. L. | 1 0 29.62 | 2.14934 | 70.24 | + 6 42 54.8 | +3.04587 |
| 13 | 288 | I. U. | 1 28 58.14 | 2.15749 | 70.94 | +10 21 37.9 | +3.03019 |
| 14 | 288 | II. L. | 2 0 26.27 | 2.16776 | 71.80 | +13 50 22.9 | +3.00505 |
| 14 | 289 | II. U. | 2 30 15.12 | 2.17858 | 72.80 | +17 4 59.7 | +2.96876 |
| 15 | 289 | II. L. | 3 0 49.94 | 2.18955 | 73.81 | +20 1 27.4 | +2.91939 |
| 15 | 290 | II. U. | 3 32 10.48 | 2.19965 | 74.76 | +22 36 3.6 | +2.85291 |
| 16 | 290 | II. L. | 4 4 11.54 | 2.20820 | 75.54 | +24 45 33.5 | +2.76425 |
| 16 | 291 | II. U. | 4 36 43.92 | 2.21378 | 76.10 | +26 27 27.0 | +2.64078 |
| 17 | 291 | II. L. | 5 9 32.90 | 2.21560 | 76.33 | +27 40 1.9 | +2.45834 |
| 17 | 292 | II. U. | 5 42 20.77 | 2.21355 | 76.15 | +28 22 36.4 | +2.14019 |
| 18 | 292 | II. L. | 6 14 49.12 | 2.20705 | 75.61 | +28 35 29.7 | —0.88649 |
| 18 | 293 | II. U. | 6 46 39.86 | 2.19687 | 74.69 | +28 19 55.0 | —2.16406 |
| 19 | 293 | II. L. | 7 17 38.32 | 2.18307 | 73.52 | +27 37 50.1 | —2.43537 |
| 19 | 294 | II. U. | 7 47 33.13 | 2.16673 | 72.09 | +26 31 46.7 | —2.58591 |
| 20 | 294 | II. L. | 8 16 18.56 | 2.14879 | 70.58 | +25 4 29.6 | —2.68465 |
| 20 | 295 | II. U. | 8 43 52.61 | 2.13011 | 69.00 | +23 18 45.7 | —2.75587 |
| 21 | 295 | II. L. | 9 10 17.09 | 2.11157 | 67.45 | +21 17 20.1 | —2.80767 |
| 21 | 296 | II. U. | 9 35 36.61 | 2.09377 | 66.01 | +19 2 43.5 | —2.84634 |
| 22 | 296 | II. L. | 9 59 57.53 | 2.07748 | 64.71 | +16 37 13.8 | —2.87581 |
| 22 | 297 | II. U. | 10 23 27.53 | 2.06300 | 63.57 | +14 2 53.4 | —2.89796 |
| 23 | 297 | II. L. | 10 46 14.78 | 2.05081 | 62.59 | +11 21 32.5 | —2.91421 |
| 23 | 298 | II. U. | 11 8 27.92 | 2.04100 | 61.83 | + 8 34 49.7 | —2.92655 |
| 24 | 298 | II. L. | 11 30 15.39 | 2.03395 | 61.25 | + 5 44 15.6 | —2.93465 |
| 24 | 299 | II. U. | 11 51 45.75 | 2.02946 | 60.88 | + 2 51 13.6 | —2.93897 |
| 25 | 300 | II. L. | 12 13 7.27 | 2.02796 | 60.73 | — 0 2 56.1 | —2.94022 |
| 25 | 300 | II. U. | 12 34 28.03 | 2.02906 | 60.78 | — 2 56 54.3 | —2.93812 |
| 26 | 301 | II. L. | 12 55 56.00 | 2.03282 | 61.01 | — 5 49 21.8 | —2.93258 |
| 26 | 301 | II. U. | 13 17 38.96 | 2.03902 | 61.44 | — 8 38 55.8 | —2.92335 |
| 27 | 302 | II. L. | 13 39 44.36 | 2.04766 | 62.05 | —11 24 10.0 | —2.91004 |
| 27 | 302 | II. U. | 14 2 19.40 | 2.05809 | 62.83 | —14 3 32.2 | —2.89176 |
| 28 | 303 | II. L. | 14 25 30.65 | 2.07037 | 63.74 | —16 35 22.9 | —2.86770 |
| 29 | 303 | I. U. | 14 47 14.66 | 2.08332 | 64.76 | —18 57 56.4 | —2.83658 |
| 29 | 304 | I. L. | 15 11 53.23 | 2.09771 | 65.89 | —21 9 18.7 | —2.79623 |
| 30 | 304 | I. U. | 15 37 22.45 | 2.11244 | 67.07 | —23 7 30.5 | —2.74382 |
| 30 | 305 | I. L. | 16 3 44.10 | 2.12688 | 68.23 | —24 50 28.1 | —2.67514 |
| 31 | 305 | I. U. | 16 30 57.61 | 2.14041 | 69.37 | —26 16 6.7 | —2.58127 |
| 31 | 306 | I. L. | 16 58 59.81 | 2.15238 | 70.37 | —27 22 24.8 | —2.44716 |
| Nov. 1 | 306 | I. U. | 17 27 44.48 | 2.16215 | 71.22 | —28 7 35.1 | —2.23147 |
| 1 | 307 | I. L. | 17 57 2.70 | 2.16918 | 71.88 | —28 30 5.3 | —1.72997 |
| 2 | 307 | I. U. | 18 26 43.48 | 2.17339 | 72.30 | —28 28 45.8 | +1.82866 |
| 2 | 308 | I. L. | 18 56 34.76 | 2.17435 | 72.43 | —28 2 57.7 | +2.28012 |
| 3 | 308 | I. U. | 19 26 24.05 | 2.17254 | 72.28 | —27 12 33.1 | +2.49554 |
| 3 | 309 | I. L. | 19 56 0.44 | 2.16820 | 71.91 | —25 57 55.6 | +2.63589 |
| 4 | 309 | I. U. | 20 25 15.07 | 2.16194 | 71.37 | —24 19 57.8 | +2.73719 |
| 4 | 310 | I. L. | 20 54 1.91 | 2.15464 | 70.74 | —22 19 57.5 | +2.81465 |
| 5 | 310 | I. U. | 21 22 18.26 | 2.14660 | 70.08 | —19 59 32.1 | +2.87506 |
| 5 | 311 | I. L. | 21 50 4.56 | 2.13878 | 69.45 | —17 20 35.6 | +2.92309 |
| 6 | 311 | I. U. | 22 17 23.75 | 2.13252 | 68.90 | —14 25 12.7 | +2.96114 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Nov. 6 | 312 | I. L. | 22 44 21.68 | 2.12740 | 68.47 | —11 15 39.7 | +2.99078 |
| 7 | 312 | I. U. | 23 11 5.08 | 2.12483 | 68.25 | — 7 54 23.4 | +3.01347 |
| 7 | 313 | I. L. | 23 37 43.21 | 2.12444 | 68.23 | — 4 24 3.4 | +3.02999 |
| 8 | 314 | I. U. | 0 4 25.69 | 2.12727 | 68.44 | — 0 47 35.3 | +3.04048 |
| 8 | 314 | I. L. | 0 31 23.30 | 2.13239 | 68.87 | + 2 51 54.3 | +3.04509 |
| 9 | 315 | I. U. | 0 58 45.94 | 2.14051 | 69.52 | + 6 30 59.8 | +3.03874 |
| 9 | 315 | I. L. | 1 26 44.61 | 2.15103 | 70.39 | +10 5 57.3 | +3.02436 |
| 10 | 316 | I. U. | 1 55 28.73 | 2.16349 | 71.46 | +13 32 48.2 | +3.00296 |
| 10 | 316 | I. L. | 2 25 5.84 | 2.17702 | 72.63 | +16 47 22.6 | +2.97128 |
| 11 | 317 | I. U. | 2 55 40.61 | 2.19103 | 73.86 | +19 45 23.9 | +2.92480 |
| 12 | 317 | II. L. | 3 29 44.26 | 2.20471 | 75.06 | +22 22 39.5 | +2.86207 |
| 12 | 318 | II. U. | 4 2 13.96 | 2.21574 | 76.08 | +24 35 19.7 | +2.77510 |
| 13 | 318 | II. L. | 4 35 26.74 | 2.22381 | 76.81 | +26 20 6.4 | +2.65331 |
| 13 | 319 | II. U. | 5 9 6.47 | 2.22755 | 77.18 | +27 34 41.4 | +2.47012 |
| 14 | 319 | II. L. | 5 42 52.11 | 2.22660 | 77.14 | +28 17 50.9 | +2.13609 |
| 14 | 320 | II. U. | 6 16 20.96 | 2.22053 | 76.63 | +28 29 35.6 | —1.25042 |
| 15 | 320 | II. L. | 6 49 10.87 | 2.20978 | 75.68 | +28 11 10.0 | —2.21511 |
| 15 | 321 | II. U. | 7 21 3.58 | 2 19507 | 74.39 | +27 24 45.3 | —2.47305 |
| 16 | 321 | II. L. | 7 51 45.67 | 2.17728 | 72.88 | +26 13 14.8 | —2.61794 |
| 16 | 322 | II. U. | 8 21 9.85 | 2.15761 | 71.24 | +24 39 50.5 | —2.71282 |
| 17 | 322 | II. L. | 8 49 14.11 | 2.13704 | 69.50 | +22 47 48.2 | —2.77931 |
| 17 | 323 | II. U. | 9 16 0.86 | 2.11671 | 67.85 | +20 40 16.4 | —2.82698 |
| 18 | 323 | II. L. | 9 41 35.85 | 2.09740 | 66.31 | +18 20 6.5 | —2.86189 |
| 18 | 324 | II. U. | 10 6 6.72 | 2.07979 | 64.92 | +15 49 46.9 | —2.88835 |
| 19 | 324 | II. L. | 10 29 42.29 | 2.06408 | 63.72 | +13 11 29.0 | —2.90757 |
| 19 | 325 | II. U. | 10 52 31.79 | 2.05111 | 62.72 | +10 27 7.6 | —2.92117 |
| 20 | 325 | II. L. | 11 14 45.24 | 2.04092 | 61.93 | + 7 38 22.9 | —2.93059 |
| 20 | 326 | II. U. | 11 36 2.05 | 2.03363 | 61.35 | + 4 46 39.9 | —2.93641 |
| 21 | 326 | II. L. | 11 58 1.59 | 2.02938 | 60.99 | + 1 53 18.2 | —2.93902 |
| 21 | 327 | II. U. | 12 19 23.03 | 2.02820 | 60.87 | — 1 0 27.4 | —2.93837 |
| 22 | 328 | II. L. | 12 40 45.16 | 2.02971 | 60.95 | — 3 53 24.3 | —2.93495 |
| 22 | 328 | II. U. | 13 2 16.55 | 2.03451 | 61.22 | — 6 44 22.2 | —2.92845 |
| 23 | 329 | II. L. | 13 24 5.93 | 2.04155 | 61.70 | — 9 32 1.6 | —2.91808 |
| 23 | 329 | II. U. | 13 46 20.83 | 2.05123 | 62.37 | —12 14 58.2 | —2.90352 |
| 24 | 330 | II. L. | 14 9 9.27 | 2.06292 | 63.20 | —14 51 42.1 | —2.88406 |
| 24 | 330 | II. U. | 14 32 38.32 | 2.07653 | 64.18 | —17 20 33.6 | —2.85848 |
| 25 | 331 | II. L. | 14 56 54.20 | 2.09114 | 65.29 | —19 39 42.1 | —2.82504 |
| 25 | 331 | II. U. | 15 22 1.56 | 2.10660 | 66.49 | -21 47 6.1 | —2.78132 |
| 26 | 332 | II. L. | 15 48 3.74 | 2.12199 | 67.69 | -23 40 38.7 | —2.72370 |
| 26 | 332 | II. U. | 16 15 0.46 | 2.13678 | 68.90 | —25 18 5.8 | —2.64689 |
| 27 | 333 | I. L. | 16 40 32.69 | 2.14971 | 70.01 | —26 37 15.8 | —2.53970 |
| 28 | 333 | I. U. | 17 9 10.05 | 2.16098 | 70.98 | —27 36 1.3 | —2.37967 |
| 28 | 334 | I. L. | 17 38 27.24 | 2.16979 | 71.75 | -28 12 33.3 | —2.09621 |
| 29 | 334 | I. U. | 18 8 13.10 | 2.17516 | 72.24 | —28 25 26.5 | —0.57978 |
| 29 | 335 | I. L. | 18 38 13.91 | 2.17696 | 72.43 | —28 13 46.1 | +2.07990 |
| 30 | 335 | I. U. | 19 8 15.90 | 2.17580 | 72.33 | —27 37 17.8 | +2.38899 |
| 30 | 336 | I. L. | 19 38 5.42 | 2.17131 | 71.99 | —26 36 20.4 | +2.56217 |
| Dec. 1 | 336 | I. U. | 20 7 31.36 | 2.16441 | 71.44 | —25 11 45.9 | +2.68115 |
| 1 | 337 | I. L. | 20 36 25.33 | 2.15552 | 70.73 | —23 24 58.5 | +2.76856 |
| 2 | 337 | I. U. | 21 4 42.41 | 2.14582 | 69.92 | —21 17 43.1 | +2.83525 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Dec. 2 | 338 | I. L. | 21 32 21.57 | 2.13596 | 69.10 | —18 52 0.1 | +2.88722 |
| 3 | 338 | I. U. | 21 59 24.64 | 2.12672 | 68.39 | —16 9 58.5 | +2.92809 |
| 3 | 339 | I. L. | 22 25 56.11 | 2.11886 | 67.79 | —13 13 53.4 | +2.96009 |
| 4 | 339 | I. U. | 22 52 2.79 | 2.11310 | 67.35 | —10 6 1.6 | +2.98466 |
| 4 | 340 | I. L. | 23 17 53.08 | 2.10978 | 67.11 | — 6 48 42.9 | +3.00273 |
| 5 | 340 | I. U. | 23 43 36.59 | 2.10934 | 67.07 | — 3 24 23.0 | +3.01515 |
| 5 | 341 | I. L. | 0 9 23.75 | 2.11177 | 67.26 | + 0 4 29.1 | +3.02189 |
| 6 | 342 | I. U. | 0 35 25.55 | 2.11730 | 67.70 | + 3 35 14.3 | +3.02288 |
| 6 | 342 | I. L. | 1 1 53.21 | 2.12581 | 68.39 | + 7 5 0.8 | +3.01779 |
| 7 | 343 | I. U. | 1 28 57.77 | 2.13678 | 69.30 | +10 30 40.5 | +3.00544 |
| 7 | 343 | I. L. | 1 56 49.60 | 2.15073 | 70.44 | +13 48 49.9 | +2.98511 |
| 8 | 344 | I. U. | 2 25 37.75 | 2.16560 | 71.64 | +16 55 47.6 | +2.95463 |
| 8 | 344 | I. L. | 2 55 28.34 | 2.18130 | 72.97 | +19 47 45.5 | +2.91132 |
| 9 | 345 | I. U. | 3 26 24.24 | 2.19645 | 74.29 | +22 20 37.8 | +2.85150 |
| 9 | 345 | I. L. | 3 58 23.05 | 2.21029 | 75.50 | +24 30 36.1 | +2.76834 |
| 10 | 346 | I. U. | 4 31 16.60 | 2.22084 | 76.45 | +26 14 10.6 | +2.65011 |
| 10 | 346 | I. L. | 5 4 49.49 | 2.22768 | 77.03 | +27 28 30.7 | +2.47026 |
| 11 | 347 | II. U. | 5 41 16.26 | 2.22930 | 77.16 | +28 11 48.2 | +2.13893 |
| 12 | 347 | II. L. | 6 15 3.59 | 2.22580 | 76.83 | +28 23 29.4 | —1.28780 |
| 12 | 348 | II. U. | 6 48 21.53 | 2.21714 | 76.08 | +28 4 18.7 | —2.23019 |
| 13 | 348 | II. L. | 7 20 48.12 | 2.20341 | 74.92 | +27 16 9.9 | —2.48940 |
| 13 | 349 | II. U. | 7 52 7.61 | 2.18639 | 73.41 | +26 1 49.6 | —2.63498 |
| 14 | 349 | II. L. | 8 22 9.51 | 2.16688 | 71.79 | +24 24 36.2 | —2.73006 |
| 14 | 350 | II. U. | 8 50 49.62 | 2.14607 | 70.06 | +22 27 58.5 | —2.79630 |
| 15 | 350 | II. L. | 9 18 9.26 | 2.12535 | 68.39 | +20 15 26.1 | —2.84354 |
| 15 | 351 | II. U. | 9 44 13.49 | 2.10514 | 66.80 | +17 50 5.5 | —2.87754 |
| 16 | 351 | II. L. | 10 9 9.31 | 2.08690 | 65.36 | +15 14 45.3 | —2.90189 |
| 16 | 352 | II. U. | 10 33 5.92 | 2.07015 | 64.10 | +12 31 52.8 | —2.91908 |
| 17 | 352 | II. L. | 10 56 13.17 | 2.05618 | 63.10 | + 9 43 33.4 | —2.93069 |
| 17 | 353 | II. U. | 11 18 40.88 | 2.04505 | 62.24 | + 6 51 34.3 | —2.93787 |
| 18 | 353 | II. L. | 11 40 39.24 | 2.03711 | 61.67 | + 3 57 29.2 | —2.94136 |
| 18 | 354 | II. U. | 12 2 18.14 | 2.03218 | 61.30 | + 1 2 39.4 | —2.94171 |
| 19 | 355 | II. L. | 12 23 47.10 | 2.03044 | 61.13 | — 1 51 42.2 | —2.93907 |
| 19 | 355 | II. U. | 12 45 15.63 | 2.03177 | 61.18 | — 4 44 24.8 | —2.93344 |
| 20 | 356 | II. L. | 13 6 52.84 | 2.03631 | 61.46 | — 7 34 18.7 | —2.92463 |
| 20 | 356 | II. U. | 13 28 47.85 | 2.04380 | 61.97 | —10 20 11.8 | —2.91254 |
| 21 | 357 | II. L. | 13 51 9.00 | 2.05331 | 62.66 | —13 0 46.9 | —2.89636 |
| 21 | 357 | II. U. | 14 14 4.75 | 2.06554 | 63.52 | —15 34 38.6 | —2.87518 |
| 22 | 358 | II. L. | 14 37 42.83 | 2.07929 | 64.55 | —18 0 10.5 | —2.84770 |
| 22 | 358 | II. U. | 15 2 10.09 | 2.09489 | 65.69 | —20 15 36.0 | —2.81211 |
| 23 | 359 | II. L. | 15 27 31.70 | 2.11076 | 66.91 | —22 18 56.5 | —2.76574 |
| 23 | 359 | II. U. | 15 53 51.56 | 2.12717 | 68.18 | —24 8 1.4 | —2.70432 |
| 24 | 360 | II. L. | 16 21 10.62 | 2.14304 | 69.42 | —25 40 33.1 | —2.62076 |
| 24 | 360 | II. U. | 16 49 26.95 | 2.15676 | 70.57 | —26 54 14.4 | —2.50161 |
| 25 | 361 | II. L. | 17 18 34.01 | 2.16867 | 71.55 | —27 46 51.6 | —2.31576 |
| 25 | 361 | II. U. | 17 48 23.14 | 2.17751 | 72.31 | —28 16 26.6 | —1.94300 |
| 26 | 362 | II. L. | 18 18 41.27 | 2.18278 | 72.80 | —28 21 27.5 | +1.58092 |
| 27 | 363 | I. U. | 18 46 47.51 | 2.18447 | 72.95 | —28 0 59.8 | +2.22167 |
| 27 | 364 | I. L. | 19 17 18.35 | 2.18230 | 72.77 | —27 14 50.8 | +2.46879 |
| 28 | 364 | I. U. | 19 47 33.20 | 2.17684 | 72.30 | —26 3 31.1 | +2.62097 |

## WASHINGTON MERIDIAN.

| Mean Solar Date. | Sidereal Date. | Limb and Transit. | Apparent Right Ascension in Time. | Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude. | Sidereal Time of Semi-diameter passing the Meridian. | Declination. | Logarithm Variation of Moon's Declination for 1 hour of Longitude. |
|---|---|---|---|---|---|---|---|
| | d. | | h. m. s. | | s. | ° ′ ″ | |
| Dec. 28 | 365 | I. L. | 20 17 19.90 | 2.16879 | 71.61 | − 24 28 12.4 | +2.72722 |
| 29 | 365 | I. U. | 20 46 29.37 | 2.15882 | 70.81 | −22 30 40.4 | +2.80611 |
| 29 | 366 | I. L. | 21 14 56.76 | 2.14774 | 69.93 | −20 13 4.4 | +2.86576 |
| 30 | 366 | I. U. | 21 42 40.83 | 2.13656 | 69.07 | −17 37 54.0 | +2.91158 |
| 30 | 367 | I. L. | 22 9 43.95 | 2.12613 | 68.27 | −14 47 41.4 | +2.94675 |
| 31 | 367 | I. U. | 22 36 11.12 | 2.11707 | 67.59 | −11 45 3.5 | +2.97340 |
| 31 | 368 | I. L. | 23 2 9.46 | 2.11003 | 67.08 | − 8 32 35.4 | +2.99330 |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change |
|---|---|---|---|---|---|---|---|
| | 35 Piscium. 0h. 7m. | *d* Piscium. 0h. 13m. | 44 Piscium. 0h. 18m. | 13 Ceti. 0h. 27m. | δ Piscium. 0h. 41m. | 20 Ceti. 0h. 45m. | |
| d | s. | s. | s. | s. | s. | s. | |
| 13 | 32.97 | 10.60 | 0.60 | 49.55 | 12.20 | 38.42 | —.010 |
| 40 | 32.75 | 10.38 | 0.38 | 49.31 | 11.93 | 38.15 | —.007 |
| 68 | 32.67 | 10.29 | 0.28 | 49.19 | 11.79 | 38.00 | .000 |
| 95 | 32.86 | 10.46 | 0.44 | 49.33 | 11.87 | 38.07 | +.010 |
| 123 | 33.36 | 10.94 | 0.90 | 49.76 | 12.26 | 38.47 | .018 |
| 150 | 34.09 | 11.67 | 1.61 | 50.46 | 12.96 | 39.12 | .029 |
| 178 | 34.99 | 12.56 | 2.50 | 51.34 | 13.84 | 39.99 | .033 |
| 205 | 35.83 | 13.40 | 3.34 | 52.20 | 14.70 | 40.85 | .030 |
| 233 | 36.51 | 14.10 | 4.05 | 52.92 | 15.45 | 41.60 | .021 |
| 260 | 36.91 | 14.51 | 4.47 | 53.37 | 15.94 | 42.09 | .012 |
| 288 | 37.05 | 14.65 | 4.62 | 53.55 | 16.15 | 42.33 | +.002 |
| 315 | 36.98 | 14.58 | 4.56 | 53.51 | 16.14 | 42.32 | —.005 |
| 342 | 36.74 | 14.37 | 4.36 | 53.32 | 15.97 | 42.16 | —.009 |
| Dec. = | + 7° 59′ | + 7° 23′ | + 1° 9′ | — 4° 23′ | + 6° 48′ | — 1° 56′ | |
| Mag. = | 6 | 6.5 | 6 | 6.5 | 4.5 | 5.6 | |
| | ε Piscium. 0h. 55m. | *e* Piscium. 1h. 0m. | ζ¹ Piscium. 1h. 6m. | 40 Ceti 1h. 9m. | μ Piscium. 1h. 22m | η Piscium. 1h. 23m. | |
| | s. | s. | s. | s. | s. | s. | |
| 14 | 27.79 | 56.69 | 12.08 | 36.36 | 38.13 | 46.49 | —.012 |
| 41 | 27.51 | 56.41 | 11.79 | 36.07 | 37.82 | 46.16 | .010 |
| 69 | 27.33 | 56.21 | 11.59 | 35.87 | 37.59 | 45.91 | —.005 |
| 96 | 27.39 | 56.27 | 11 62 | 35.89 | 37.58 | 45.90 | +.005 |
| 124 | 27.78 | 56.63 | 11.98 | 36.22 | 37.89 | 46.21 | .018 |
| 151 | 28.44 | 57.27 | 12.63 | 36.86 | 38.50 | 46.84 | .024 |
| 179 | 29.31 | 58.14 | 13.49 | 37.71 | 39.34 | 47.70 | .033 |
| 206 | 30.17 | 59.00 | 14.36 | 38.57 | 40.21 | 48.59 | .032 |
| 234 | 30.98 | 59.76 | 15.13 | 39.35 | 41.00 | 49.41 | .026 |
| 261 | 31.41 | 60.28 | 15.67 | 39.88 | 41.58 | 49.99 | .015 |
| 289 | 31.70 | 60.55 | 15.96 | 40.18 | 41.91 | 50.33 | +.006 |
| 316 | 31.72 | 60.59 | 16.00 | 40.23 | 42.01 | 50.45 | .000 |
| 343 | 31.57 | 60.44 | 15.88 | 40.11 | 41.92 | 50.36 | —.007 |
| Dec. = | + 7° 7′ | + 4° 53′ | + 6° 49′ | — 3° 2′ | + 5° 24′ | + 14° 36′ | |
| Mag. = | 4 | 6.5 | 5.4 | 6 | 5 | 4.3 | |
| | π Piscium. 1h. 29m. | ν Piscium. 1h. 33m. | ο Piscium. 1h. 37m. | ι Arietis. 1h. 49m. | ξ¹ Ceti. 2h. 5m. | θ Arietis. 2h. 10m. | |
| | s. | s. | s. | s. | s. | s. | |
| 14 | 27.76 | 56.05 | 47.28 | 29.10 | 22.00 | 7.10 | —.012 |
| 41 | 27.45 | 55.74 | 46.96 | 28.76 | 21.67 | 6.74 | .012 |
| 69 | 27.18 | 55.48 | 46.70 | 28.46 | 21.35 | 6.39 | —.008 |
| 96 | 27.16 | 55.47 | 46.65 | 28.37 | 21.24 | 6.26 | +.002 |
| 124 | 27.45 | 55.73 | 46.92 | 28.63 | 21.43 | 6.46 | .015 |
| 151 | 28.06 | 56.31 | 47.50 | 29.20 | 21.95 | 6.99 | .026 |
| 179 | 28.91 | 57.14 | 48.34 | 30.05 | 22.74 | 7.81 | .032 |
| 206 | 29.78 | 58.00 | 49.21 | 30.94 | 23.61 | 8.71 | .032 |
| 234 | 30.60 | 58.80 | 50.04 | 31.79 | 24.45 | 9.60 | .028 |
| 261 | 31.19 | 59.40 | 50.64 | 32.44 | 25.11 | 10.29 | .021 |
| 289 | 31.54 | 59.76 | 50.01 | 32.88 | 25.57 | 10.78 | .010 |
| 316 | 31.66 | 59.89 | 51.15 | 33.05 | 25.78 | 11.02 | +.002 |
| 343 | 31.59 | 59.82 | 51.09 | 33.02 | 25.78 | 11.04 | —.005 |
| Dec. = | 11° 24′ | + 4° 45′ | + 8° 26′ | + 17° 7′ | + 8° 10′ | + 19° 14′ | |
| Mag. = | 6 | 5.4 | 4 | 6 | 4.5 | 6.5 | |
| | ξ² Ceti. 2h. 20m. | 38 Arietis. 2h. 37m. | π Arietis. 2h. 41m. | ρ³ Arietis. 2h. 48m. | ε Arietis. 2h. 50m. | 53 Arietis. 2h. 59m. | |
| | s. | s. | s. | s. | s. | s. | |
| 15 | 30.31 | 7.05 | 15.72 | 18.82 | 59.11 | 19.57 | —.011 |
| 42 | 29.98 | 6.71 | 15.36 | 18.46 | 58.75 | 19.21 | .016 |
| 70 | 29.64 | 6.34 | 14.98 | 18.07 | 58.34 | 18.81 | .012 |
| 97 | 29.49 | 6.16 | 14.79 | 17.87 | 58.12 | 18.58 | —.002 |
| 125 | 29.66 | 6.29 | 14.91 | 17.97 | 58.21 | 18.65 | +.010 |
| 152 | 30.15 | 6.74 | 15.37 | 18.42 | 58.67 | 19.07 | .023 |
| 180 | 30.93 | 7.51 | 16.14 | 19.18 | 59.44 | 19.81 | .030 |
| 207 | 31.79 | 8.37 | 17.02 | 20.05 | 60.32 | 20.67 | .029 |
| 235 | 32.64 | 9.25 | 17.92 | 20.96 | 61.25 | 21.58 | .028 |
| 262 | 33.12 | 9.96 | 18.65 | 21.71 | 62.01 | 22.34 | .023 |
| 290 | 33.81 | 10.50 | 19.21 | 22.29 | 62.61 | 22.95 | .017 |
| 317 | 34.06 | 10.80 | 19.53 | 22.64 | 62.97 | 23.32 | +.007 |
| 344 | 34.09 | 10.87 | 19.62 | 22.75 | 63.09 | 23.47 | —.001 |
| Dec. = | + 7° 49′ | + 11° 51′ | + 16° 53′ | + 17° 27′ | + 20° 46′ | + 17° 19′ | |
| Mag. = | 4 | 5 | 6.5 | 6 | 4.5 | 6 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
| | δ Arietis.<br>3$^{h.}$ 3$^{m.}$ | ζ Arietis.<br>3$^{h.}$ 6$^{m.}$ | $\tau^1$ Arietis.<br>3$^{h.}$ 12$^{m.}$ | 9 Tauri.<br>3$^{h.}$ 28$^{m.}$ | 17 Tauri.<br>3$^{h.}$ 36$^{m.}$ | η Tauri.<br>3$^{h.}$ 38$^{m.}$ | |
| d. | s. | s. | s. | s. | s. | s. | |
| 16 | 24.19 | 37.91 | 55.23 | 30.41 | 20.37 | 56.13 | —.010 |
| 43 | 23.83 | 37.55 | 54.87 | 30.05 | 20.02 | 55.78 | .016 |
| 70 | 23 43 | 37.14 | 54.45 | 29.62 | 19.58 | 55.34 | .015 |
| 97 | 23.18 | 36.88 | 54.19 | 29.31 | 19.25 | 55.01 | .005 |
| 125 | 23.25 | 36.94 | 54.23 | 29.32 | 19.24 | 54.96 | +.008 |
| 152 | 23.66 | 37.35 | 54.61 | 29.67 | 19.57 | 55.31 | .021 |
| 179 | 24.38 | 38.06 | 55.32 | 30.35 | 20.24 | 55.97 | .028 |
| 206 | 25.25 | 38.93 | 56.18 | 31.20 | 21.09 | 56.82 | .033 |
| 234 | 26.17 | 39.86 | 57.11 | 32.14 | 22.03 | 57.76 | .034 |
| 261 | 26.95 | 40.65 | 57.92 | 32.96 | 22.88 | 58.62 | .028 |
| 288 | 27.57 | 41.28 | 58.56 | 33.66 | 23.59 | 59.32 | .021 |
| 316 | 27.98 | 41.71 | 59.00 | 34.17 | 24.12 | 59.86 | .012 |
| 343 | 28.15 | 41.88 | 59.20 | 34.41 | 24.38 | 60.14 | +.003 |
| Dec. = | + 19° 11′ | + 20° 30′ | + 20° 38′ | + 22° 44′ | + 23° 40′ | + 23° 39′ | |
| Mag. = | 4.5 | 4.5 | 5 | 6 | 4 | 3 | |
| | A¹ Tauri.<br>8$^{h.}$ 56$^{m.}$ | ω² Tauri.<br>2$^{h.}$ 8$^{m.}$ | δ¹ Tauri.<br>4$^{h.}$ 14$^{m.}$ | γ² Tauri.<br>4$^{h.}$ 17$^{m.}$ | ε Tauri.<br>4$^{h.}$ 20$^{m.}$ | α Tauri.<br>4$^{h.}$ 27$^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 17 | 11.59 | 50.10 | 38.55 | 42.26 | 13.28 | 40.29 | —.008 |
| 44 | 11.24 | 49.77 | 38.25 | 41.94 | 12.96 | 39.99 | .015 |
| 71 | 10.81 | 49.34 | 37.82 | 41.49 | 12.53 | 39.56 | .016 |
| 98 | 10.46 | 48.98 | 37.46 | 41.11 | 12.16 | 39.19 | —.009 |
| 125 | 10.39 | 48.88 | 37.35 | 40.99 | 12.04 | 39.05 | +.001 |
| 152 | 10.69 | 49.14 | 37.59 | 40.23 | 12.26 | 39.25 | .015 |
| 180 | 11.31 | 49.73 | 38.15 | 41.82 | 12.83 | 39.78 | .025 |
| 207 | 12.14 | 50.52 | 38.93 | 42.61 | 13.60 | 40.52 | .031 |
| 234 | 12.82 | 51.40 | 39.79 | 43.50 | 14.46 | 41.38 | .032 |
| 261 | 13.90 | 52.27 | 40.65 | 44.38 | 15.33 | 42.23 | .030 |
| 289 | 14.67 | 53.05 | 41.43 | 45.19 | 16.12 | 43.03 | .025 |
| 317 | 15.24 | 53.65 | 42.03 | 45.82 | 16.74 | 43.66 | .017 |
| 344 | 15.54 | 53.99 | 42.38 | 46.19 | 17.11 | 44.04 | +.012 |
| Dec. = | + 21° 41′ | + 20° 13′ | + 17° 12′ | + 22° 29′ | + 18° 51′ | + 16° 13′ | |
| Mag. = | 5.4 | 6.5 | 4 | 5.4 | 4.3 | 1 | |
| | τ Tauri.<br>4$^{h.}$ 33$^{m.}$ | ι Tauri.<br>4$^{h.}$ 42$^{m.}$ | ι Aurigæ.<br>4$^{h.}$ 47$^{m.}$ | 102 Tauri.<br>4$^{h.}$ 54$^{m.}$ | 11 Orionis.<br>4$^{h.}$ 55$^{m.}$ | n Tauri.<br>5$^{h.}$ 10$^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 17 | 36.93 | 57.84 | 37.92 | 30.18 | 21.33 | 38.47 | —.006 |
| 45 | 36.61 | 57.55 | 37.60 | 29.89 | 21.06 | 38.22 | .014 |
| 72 | 36.16 | 57.11 | 37.08 | 29.44 | 20.66 | 37.77 | .017 |
| 99 | 35.76 | 56.71 | 36.63 | 29.03 | 20.22 | 37.35 | .012 |
| 126 | 35.62 | 56.56 | 36.44 | 28.85 | 20.04 | 37.13 | —.002 |
| 153 | 35.82 | 56.72 | 36.61 | 28.99 | 20.17 | 37.23 | +.012 |
| 180 | 36.35 | 57.22 | 37.14 | 29.47 | 20.63 | 37.67 | .023 |
| 208 | 37.15 | 57.98 | 37.99 | 30.22 | 21.34 | 38.39 | .031 |
| 235 | 38.04 | 58.84 | 38.93 | 31.09 | 22.17 | 39.23 | .033 |
| 262 | 38.92 | 59.71 | 39.91 | 31.95 | 23.01 | 40.11 | .033 |
| 289 | 39.73 | 60.50 | 40.80 | 32.79 | 23.81 | 40.97 | .028 |
| 317 | 40.40 | 61.18 | 41.59 | 33.51 | 24.50 | 41.78 | .022 |
| 344 | 40.83 | 61.62 | 42.09 | 33.99 | 24.97 | 42.25 | +.012 |
| Dec. = | + 22° 41′ | + 18° 35′ | + 32° 56′ | + 21° 23′ | + 15° 12′ | + 21° 57′ | |
| Mag. = | 4.5 | 5.6 | 3 | 5 | 5 | 6 | |
| | β Tauri.<br>5$^{h.}$ 17$^{m.}$ | ο Tauri.<br>5$^{h.}$ 18$^{m.}$ | ζ Tauri.<br>5$^{h.}$ 29$^{m.}$ | 129 Tauri.<br>5$^{h.}$ 38$^{m.}$ | 136 Tauri.<br>5$^{h.}$ 44$^{m.}$ | 1 Geminorum.<br>5$^{h.}$ 55$^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 18 | 12.38 | 60.01 | 3.30 | 29.52 | 17.64 | 22.95 | —.002 |
| 45 | 12.12 | 59.77 | 3.08 | 29.36 | 17.44 | 22.78 | .013 |
| 72 | 11.64 | 59.32 | 2.64 | 28.90 | 16.99 | 22.37 | .019 |
| 99 | 11.17 | 58.88 | 2.19 | 28.46 | 16.52 | 21.90 | .034 |
| 126 | 10.94 | 58.65 | 1.95 | 28.20 | 16.23 | 21.61 | —.005 |
| 154 | 11.04 | 58.74 | 2.01 | 28,24 | 16.26 | 21.62 | +.007 |
| 181 | 11.49 | 59.17 | 2.41 | 28.56 | 16.64 | 21.94 | .019 |
| 208 | 12.21 | 59.85 | 3.07 | 29.22 | 17.29 | 22.56 | .028 |
| 236 | 13.14 | 60.71 | 3.91 | 30.02 | 18.04 | 23.36 | .031 |
| 263 | 14.07 | 61.50 | 4.80 | 30.87 | 19.07 | 24.25 | .033 |
| 290 | 14.97 | 62.46 | 5.66 | 31.71 | 19.98 | 25.14 | .032 |
| 318 | 15.77 | 63.22 | 6.44 | 32.48 | 20.84 | 25.98 | .026 |
| 345 | 16.34 | 63.76 | 7.00 | 33.05 | 21.47 | 26.61 | +.017 |
| Dec. = | + 28° 29′ | + 21° 49′ | + 21° 03′ | + 15° 46′ | + 27° 34′ | + 23° 16′ | |
| Mag. = | 2 | 6 | 3.4 | 6 | 5 | 5 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
| | κ Aurigæ. $6^{h.}\ 6^{m.}$ | η Geminorum. $6^{h.}\ 6^{m.}$ | μ Geminorum. $6^{h.}\ 14^{m.}$ | ν Geminorum. $6^{h.}\ 20^{m.}$ | 49 Aurigæ. $6^{h.}\ 26^{m.}$ | ε Geminorum $6^{h.}\ 35^{m.}$ | |
| d. | s. | s. | s. | s. | s. | s. | |
| 19 | 13.15 | 12.17 | 15.98 | 25.77 | 8.99 | 5.42 | +.002 |
| 46 | 12.99 | 12.01 | 15.84 | 25.64 | 8.87 | 5.33 | —.012 |
| 74 | 12.54 | 11.59 | 15.42 | 25.24 | 8.45 | 4.93 | .018 |
| 101 | 12.04 | 11.13 | 14.96 | 24.78 | 7.96 | 4.46 | .015 |
| 128 | 11.73 | 10.83 | 14.66 | 24.47 | 7.62 | 4.12 | —.007 |
| 156 | 11.72 | 10.83 | 14.63 | 24.43 | 7.57 | 4.04 | +.007 |
| 184 | 12.08 | 11.17 | 14.96 | 24.74 | 7.87 | 4.32 | .017 |
| 211 | 12.72 | 11.78 | 15.55 | 25.29 | 8.45 | 4.86 | .026 |
| 239 | 13.57 | 12.58 | 16.28 | 26.06 | 9.27 | 5.64 | .030 |
| 266 | 14.51 | 13.46 | 17.21 | 26.91 | 10.15 | 6.50 | .034 |
| 293 | 15.43 | 14.36 | 18.11 | 27.80 | 11.10 | 7.42 | .033 |
| 321 | 16.35 | 15.20 | 18.97 | 28.66 | 12.02 | 8.33 | .028 |
| 348 | 17.02 | 15.83 | 19.62 | 29.31 | 12.73 | 9.04 | +.020 |
| Dec. = | + 29° 33′ | + 22° 33′ | + 22° 35′ | + 20° 18′ | + 28° 8′ | + 25° 16′ | |
| Mag. = | 5.4 | 3.4 | 3 | 5.4 | 6.5 | 3.4 | |
| | ω Geminorum. $6^{h.}\ 53^{m.}$ | ζ Geminorum. $6^{h.}\ 55^{m.}$ | τ Geminorum. $7^{h.}\ 1^{m.}$ | δ Geminorum. $7^{h.}\ 11^{m.}$ | ι Geminorum. $7^{h.}\ 16^{m.}$ | α² Geminor. $7^{h.}\ 25^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 19 | 39.36 | 35.09 | 59.44 | 32.43 | 48.16 | 25.72 | +.007 |
| 46 | 39.32 | 35.04 | 59.41 | 32.42 | 48.17 | 25.78 | —.008 |
| 74 | 38.94 | 34.69 | 59.04 | 32.09 | 47.83 | 25.46 | .017 |
| 102 | 38.47 | 34.21 | 58.52 | 31.53 | 47.34 | 24.96 | .016 |
| 129 | 37.92 | 33.87 | 58.14 | 31.26 | 46.95 | 24.55 | —.009 |
| 156 | 38.01 | 33.77 | 58.01 | 31.11 | 46.80 | 24.33 | +.003 |
| 184 | 38.24 | 33.98 | 58.22 | 31.25 | 46.97 | 24.44 | .012 |
| 212 | 38.74 | 34.47 | 58.75 | 31.67 | 47.43 | 24.88 | .024 |
| 239 | 39.45 | 35.16 | 59.45 | 32.32 | 48.10 | 25.52 | .029 |
| 266 | 40.29 | 35.97 | 60.33 | 33.10 | 48.93 | 26.36 | .033 |
| 294 | 41.24 | 36.88 | 61.33 | 34.02 | 49.90 | 27.34 | .035 |
| 321 | 42.13 | 37.77 | 62.28 | 34.94 | 50.85 | 28.36 | .033 |
| 349 | 42.92 | 38.54 | 63.12 | 35.77 | 51.70 | 29.28 | +.025 |
| Dec. = | + 24° 25′ | + 20° 47′ | + 30° 29′ | + 22° 15′ | + 28° 5′ | + 32° 12′ | |
| Mag. = | 6 | 4 | 5.4 | 3.4 | 4 | 2.1 | |
| | β Geminorum. $7^{h.}\ 36^{m.}$ | φ Geminorum. $7^{h.}\ 44^{m.}$ | 6 Cancri. $7^{h.}\ 54^{m.}$ | 12 Cancri. $8^{h.}\ 0^{m.}$ | ζ¹ Cancri. $8^{h.}\ 3^{m.}$ | λ Cancri. $8^{h.}\ 11^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 20 | 31.20 | 42.03 | 41.26 | 40.53 | 58.11 | 59.26 | +.012 |
| 47 | 31.30 | 42.11 | 41.36 | 40.64 | 58.33 | 59.42 | —.004 |
| 75 | 30.99 | 41.82 | 41.10 | 40.40 | 58.10 | 59.20 | .013 |
| 102 | 30.53 | 41.36 | 40.64 | 40.01 | 57.69 | 58.78 | .017 |
| 130 | 30.10 | 40.93 | 40.23 | 39.62 | 57.31 | 58.38 | .011 |
| 157 | 29.89 | 40.76 | 40.01 | 39.41 | 57.10 | 58.14 | —.002 |
| 185 | 29.99 | 40.84 | 40.06 | 39.46 | 57.14 | 58.17 | +.006 |
| 212 | 30.35 | 41.22 | 40.42 | 39.76 | 57.44 | 58.45 | .016 |
| 240 | 30.97 | 41.83 | 41.16 | 40.29 | 57.97 | 58.99 | .024 |
| 267 | 31.77 | 42.62 | 41.78 | 40.97 | 58.67 | 59.70 | .030 |
| 294 | 32.69 | 43.60 | 42.70 | 41.81 | 59.52 | 60.57 | .035 |
| 322 | 33.70 | 44.51 | 43.69 | 42.72 | 60.45 | 61.55 | .031 |
| 350 | 34.59 | 45.43 | 44.63 | 43.58 | 61.25 | 62.47 | +.029 |
| Dec. = | + 28° 22′ | + 27° 8′ | + 28° 12′ | + 14° 6′ | + 18° 5′ | + 24° 29′ | |
| Mag. = | 1.2 | 5 | 5 | 6 | 5.4 | 6 | |
| | θ Cancri. $8^{h.}\ 23^{m.}$ | γ Cancri. $8^{h.}\ 34^{m.}$ | δ Cancri. $8^{h.}\ 36^{m.}$ | ϱ³ Cancri. $8^{h.}\ 47^{m.}$ | α Cancri. $8^{h.}\ 50^{m.}$ | κ Cancri. $8^{h.}\ 59^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 20 | 24.07 | 58.04 | 31.07 | 3.04 | 37.59 | 57.85 | +.016 |
| 48 | 24.25 | 58.25 | 31.29 | 3.31 | 37.83 | 58.12 | .000 |
| 76 | 24.04 | 58.08 | 31.12 | 3.16 | 37.70 | 58.02 | —.010 |
| 103 | 23.66 | 57.70 | 30.75 | 2.77 | 37.42 | 57.69 | .015 |
| 130 | 23.28 | 57.31 | 30.37 | 2.37 | 37.00 | 57.33 | .012 |
| 158 | 23.04 | 57.05 | 30.12 | 2.06 | 36.74 | 57.07 | —.005 |
| 186 | 23.04 | 57.08 | 30.10 | 2.01 | 36.69 | 56.99 | +.002 |
| 213 | 23.29 | 57.25 | 30.31 | 2.20 | 36.85 | 57.14 | .012 |
| 241 | 23.79 | 57.72 | 30.76 | 2.66 | 37.25 | 57.51 | .019 |
| 268 | 24.55 | 58.38 | 31.40 | 3.32 | 37.84 | 58.07 | .027 |
| 295 | 25.28 | 59.21 | 32.12 | 4.17 | 38.61 | 58.33 | .032 |
| 323 | 26.23 | 60.18 | 33.17 | 5.19 | 39.53 | 59.74 | .035 |
| 350 | 27.11 | 61.08 | 34.05 | 6.14 | 40.41 | 60.62 | +.031 |
| Dec. = | + 18° 35′ | + 21° 59′ | + 18° 41′ | + 28° 29′ | + 12° 25′ | + 11° 15′ | |
| Mag. = | 6 | 4.5 | 4 | 6 | 4 | 5 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
| | ξ Cancri. | 83 Cancri. | λ Leonis. | ξ Leonis. | ο Leonis. | ε Leonis. | |
| | $9^{h.}\ 1^{m.}$ | $9^{h.}\ 10^{m.}$ | $9^{h.}\ 23^{m.}$ | $9^{h.}\ 24^{m.}$ | $9^{h.}\ 33^{m.}$ | $9^{h.}\ 37^{m.}$ | |
| d | s. | s. | s. | s. | s | s. | |
| 23 | 5.73 | 57.62 | 31.23 | 11.97 | 28.94 | 41.49 | +.018 |
| 50 | 5.98 | 57.88 | 31.53 | 12.26 | 29.24 | 41.85 | +.004 |
| 77 | 5.86 | 57.79 | 31.47 | 12.20 | 29.20 | 41.84 | —.008 |
| 104 | 5.51 | 57.48 | 31.16 | 11.94 | 28.94 | 41.57 | .013 |
| 131 | 5.12 | 57.10 | 30.78 | 11.56 | 28.60 | 41.20 | .012 |
| 158 | 4.85 | 56.81 | 30.49 | 11.29 | 28.33 | 40.89 | —.007 |
| 185 | 4.78 | 56.73 | 30.36 | 11.17 | 28.19 | 40.71 | .000 |
| 213 | 4.93 | 56.85 | 30.46 | 11.26 | 28.26 | 40.75 | +.007 |
| 240 | 5.31 | 57.19 | 30.77 | 11.55 | 28.52 | 41.00 | .015 |
| 268 | 5.92 | 57.77 | 31.33 | 12.07 | 29.01 | 41.51 | .024 |
| 295 | 6.71 | 58.52 | 32.09 | 12.80 | 29.74 | 42.24 | .030 |
| 323 | 7.68 | 59.46 | 33.05 | 13.69 | 30.62 | 43.19 | .034 |
| 350 | 8.62 | 60.39 | 34.01 | 14.50 | 31.53 | 44.16 | +.033 |
| Dec. = | + 22° 38′ | + 18° 19′ | + 23° 36′ | + 11° 56′ | + 10° 33′ | + 24° 26′ | |
| Mag. = | 5 | 6 | 5.4 | 6 | 4.3 | 3 | |
| | ν Leonis. | η Leonis. | α Leonis. | $\gamma^1$ Leonis. | 45 Leonis. | ρ Leonis | |
| | $9^{h.}\ 50^{m.}$ | $9^{h.}\ 59^{m.}$ | $10^{h.}\ 0^{m.}$ | $10^{h.}\ 12^{m.}$ | $10^{h.}\ 20^{m.}$ | $10^{h.}\ 25^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 23 | 29.58 | 29.64 | 42.96 | 2.67 | 3.34 | 14.57 | +.021 |
| 51 | 29.94 | 30.06 | 43.38 | 3.13 | 3.79 | 15.03 | +.007 |
| 78 | 29.94 | 30.08 | 43.41 | 3.19 | 3.86 | 15.11 | —.004 |
| 105 | 29.69 | 29.85 | 43.20 | 2.98 | 3.68 | 14.95 | .011 |
| 132 | 29.36 | 29.52 | 42.88 | 2.65 | 3.38 | 14.68 | .012 |
| 159 | 29.08 | 29.23 | 42.59 | 2.35 | 3.10 | 14.38 | .009 |
| 186 | 28.93 | 29.06 | 42.40 | 2.16 | 2.92 | 14.18 | —.003 |
| 214 | 28.96 | 29.07 | 42.39 | 2.14 | 2.87 | 14.13 | +.002 |
| 241 | 29.19 | 29.28 | 42.57 | 2.32 | 3.02 | 14.68 | .010 |
| 269 | 29.65 | 29.72 | 42.98 | 2.74 | 3.39 | 14.62 | .019 |
| 296 | 30.33 | 30.39 | 43.63 | 3.40 | 4.00 | 15.22 | .029 |
| 324 | 31.22 | 31.27 | 44.51 | 4.30 | 4.86 | 16.07 | .035 |
| 351 | 32.15 | 32.24 | 45.43 | 5.26 | 5.79 | 17.00 | +.034 |
| Dec. = | + 13° 9′ | + 17° 26′ | + 12° 40′ | + 20° 34′ | + 10° 30′ | + 10° 3′ | |
| Mag. = | 5 | 3.4 | 1.2 | 2 | 6 | 4 | |
| | 37 Sextantis. | *l* Leonis. | *c* Leonis. | χ Leonis. | *n* Leonis. | σ Leonis. | |
| | $10^{h.}\ 38^{m.}$ | $10^{h.}\ 41^{m.}$ | $10^{h.}\ 53^{m.}$ | $10^{h.}\ 57^{m.}$ | $11^{h.}\ 8^{m.}$ | $11^{h.}\ 13^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 24 | 36.72 | 41.98 | 17.69 | 36.05 | 20.54 | 43.37 | +.022 |
| 52 | 37.19 | 42.47 | 18.20 | 36.58 | 21.15 | 43.92 | +.011 |
| 79 | 37.30 | 42.59 | 18.34 | 36.73 | 21.35 | 44.13 | .000 |
| 106 | 37.15 | 42.44 | 18.24 | 36.63 | 21.27 | 44.07 | —.008 |
| 133 | 36.86 | 42.18 | 17.98 | 36.37 | 21.04 | 43.85 | .010 |
| 160 | 36.57 | 41.89 | 17.71 | 36.13 | 20.76 | 43.59 | .010 |
| 187 | 36.35 | 41.69 | 17.51 | 35.89 | 20.53 | 43.36 | .006 |
| 215 | 36.28 | 41.61 | 17.39 | 35.78 | 20.39 | 43.22 | —.001 |
| 242 | 36.39 | 41.71 | 17.47 | 35.82 | 20.42 | 43.22 | +.007 |
| 270 | 36.73 | 42.03 | 17.74 | 36.09 | 20.67 | 43.46 | .014 |
| 297 | 37.32 | 42.68 | 18.28 | 36.62 | 21.18 | 43.95 | .026 |
| 324 | 38.15 | 43.40 | 19.05 | 37.39 | 21.95 | 44.70 | .034 |
| 352 | 39.12 | 44.36 | 20.01 | 38.34 | 22.91 | 45.63 | +.035 |
| Dec. = | + 17° 8′ | + 11° 18′ | + 6° 52′ | + 8° 7′ | + 14° 6′ | + 6° 49′ | |
| Mag. = | 6 | 5 | 5 | 5 | 6 | 4 | |
| | *i* Leonis. | τ Leonis. | ν Virginis. | β Virginis. | π Virginis. | ο Virginis. | |
| | $11^{h.}\ 16^{m.}$ | $11^{h.}\ 20^{m.}$ | $11^{h.}\ 38^{m.}$ | $11^{h.}\ 43^{m.}$ | $11^{h.}\ 53^{m.}$ | $11^{h.}\ 57^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 25 | 25.47 | 32.57 | 28.23 | 12.30 | 30.22 | 53.02 | +.025 |
| 53 | 26.04 | 33.13 | 28.85 | 12.92 | 30.87 | 53.69 | .016 |
| 80 | 26.24 | 33.34 | 29.11 | 13.20 | 31.18 | 53.99 | +.004 |
| 107 | 26.18 | 33.30 | 29.11 | 13.21 | 31.21 | 54.04 | —.002 |
| 134 | 25.95 | 33.09 | 28.93 | 13.05 | 31.06 | 53.90 | .008 |
| 161 | 25.70 | 32.83 | 28.68 | 12.81 | 30.83 | 53.66 | .010 |
| 188 | 25.46 | 32.60 | 28.43 | 12.59 | 30.58 | 53.41 | .007 |
| 216 | 25.32 | 32.44 | 28.26 | 12.39 | 30.38 | 53.20 | —.001 |
| 243 | 25.33 | 32.40 | 28.21 | 12.34 | 30.30 | 53.12 | +.002 |
| 270 | 25.55 | 32.65 | 28.37 | 12.49 | 30.42 | 53.21 | .010 |
| 298 | 26.06 | 33.15 | 28.82 | 12.92 | 30.82 | 53.61 | .022 |
| 325 | 26.82 | 33.89 | 29.55 | 13.64 | 31.51 | 54.28 | .030 |
| 353 | 27.77 | 34.82 | 30.48 | 14.56 | 32.44 | 55.21 | +.034 |
| Dec. = | + 11° 49′ | + 3° 39′ | + 7° 20′ | + 2° 35′ | + 7° 25′ | + 9° 32′ | |
| Mag. = | 4 | 5 | 4.5 | 3.4 | 4.5 | 4 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
|  | Piazzi xii.<br>12<sup>h.</sup> 4<sup>m.</sup> | 13 Virginis.<br>12<sup>h.</sup> 11<sup>m.</sup> | η Virginis.<br>12<sup>h.</sup> 12<sup>m.</sup> | *c* Virginis.<br>12<sup>h.</sup> 13<sup>m.</sup> | *q* Virginis.<br>12<sup>h.</sup> 26<sup>m.</sup> | γ Virginis.<br>12<sup>h.</sup> 34<sup>m.</sup> |  |
| d | s. | s. | s. | s. | s. | s. |  |
| 27 | 18.76 | 17.98 | 32.85 | 2.92 | 21.58 | 22.32 | +.029 |
| 54 | 19.38 | 18.61 | 33.48 | 3.55 | 22.24 | 22.96 | .018 |
| 81 | 19.70 | 18.94 | 33.82 | 3.90 | 22.58 | 23.40 | .007 |
| 108 | 19.75 | 19.02 | 33.90 | 3.93 | 22.68 | 23.58 | —.001 |
| 136 | 19.61 | 18.90 | 33.78 | 3.85 | 22.65 | 23.50 | .006 |
| 163 | 19.39 | 18.68 | 33.57 | 3.63 | 22.48 | 23.28 | .009 |
| 191 | 19.14 | 18.43 | 33.32 | 3.39 | 22.19 | 23.01 | .009 |
| 219 | 18.92 | 18.20 | 33.10 | 3.16 | 21.95 | 22.78 | .007 |
| 246 | 18.84 | 18.11 | 32.99 | 3.06 | 21.76 | 22.58 | .001 |
| 274 | 18.96 | 18.21 | 33.09 | 3.16 | 21.86 | 22.67 | +.008 |
| 301 | 19.36 | 18.59 | 33.47 | 3.54 | 22.21 | 23.99 | .022 |
| 328 | 20.06 | 19.26 | 34.15 | 4.21 | 22.88 | 23.63 | .030 |
| 355 | 20.94 | 20.17 | 35.03 | 5.07 | 23.77 | 24.49 | +.035 |
| Dec. = | + 4° 51′ | + 0° 1′ | + 0° 8′ | + 4° 7′ | — 8° 39′ | — 0° 40′ |  |
| Mag. = | 6½ | 6 | 3.4 | 5 | 6 | 3.2 |  |
|  | 38 Virginis.<br>12<sup>h.</sup> 45<sup>m.</sup> | ψ Virginis.<br>12<sup>h.</sup> 46<sup>m.</sup> | δ Virginis.<br>12<sup>h.</sup> 48<sup>m.</sup> | θ Virginis.<br>13<sup>h.</sup> 2<sup>m.</sup> | α Virginis.<br>13<sup>h.</sup> 17<sup>m.</sup> | ζ Virginis.<br>13<sup>h.</sup> 27<sup>m.</sup> |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 28 | 49.28 | 52.41 | 21.45 | 30.14 | 36.75 | 21.72 | +.030 |
| 55 | 49.98 | 53.11 | 22.15 | 30.86 | 37.50 | 22.50 | .020 |
| 82 | 50.39 | 53.52 | 22.57 | 31.31 | 38.03 | 23.00 | .010 |
| 109 | 50.55 | 53.69 | 22.72 | 31.46 | 38.29 | 23.27 | .001 |
| 137 | 50.50 | 53.65 | 22.69 | 31.52 | 38.33 | 23.33 | —.004 |
| 164 | 50.33 | 53.48 | 22.51 | 31.37 | 38.21 | 23.22 | .007 |
| 192 | 50.08 | 53.22 | 22.26 | 31.13 | 37.96 | 22.98 | .010 |
| 220 | 49.82 | 52.95 | 22.00 | 30.85 | 37.66 | 22.71 | .010 |
| 247 | 49.65 | 52.78 | 21.81 | 30.63 | 37.41 | 22.44 | .004 |
| 275 | 49.66 | 52.78 | 21.82 | 30.64 | 37.34 | 22.36 | +.003 |
| 302 | 49.98 | 53.10 | 22.13 | 30.95 | 37.54 | 22.54 | .017 |
| 329 | 50.59 | 53.73 | 22.73 | 31.37 | 38.10 | 23.08 | .028 |
| 356 | 52.46 | 54.60 | 23.59 | 32.42 | 38.94 | 23.88 | +.030 |
| Dec. = | — 2° 47′ | — 8° 45′ | + 4° 11′ | — 4° 46′ | — 10° 25′ | + 0° 9′ |  |
| Mag. = | 6 | 5 | 3 | 4.5 | 1 | 3.4 |  |
|  | *m* Virginis.<br>13<sup>h.</sup> 34<sup>m.</sup> | 86 Virginis.<br>13<sup>h.</sup> 38<sup>m.</sup> | 89 Virginis.<br>13<sup>h.</sup> 42<sup>m.</sup> | 94 Virginis.<br>13<sup>h.</sup> 58<sup>m.</sup> | κ Virginis.<br>14<sup>h.</sup> 5<sup>m.</sup> | λ Virginis.<br>14<sup>h.</sup> 11<sup>m.</sup> |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 1 | 2.63 | 15.33 | 2.21 | 39.56 | 12.13 | 18.30 | —.011 |
| 29 | 3.58 | 16.29 | 3.19 | 40.51 | 13.08 | 19.26 | +.032 |
| 56 | 4.35 | 17.07 | 3.99 | 41.32 | 13.89 | 20.09 | .025 |
| 83 | 4.58 | 17.61 | 4.55 | 41.90 | 14.50 | 20.73 | .017 |
| 110 | 4.16 | 17.91 | 4.87 | 42.25 | 14.89 | 21.15 | .008 |
| 138 | 5.24 | 18.00 | 4.97 | 42.39 | 15.02 | 21.30 | .001 |
| 165 | 5.14 | 17.93 | 4.89 | 42.35 | 14.98 | 21.33 | —.006 |
| 193 | 4.91 | 17.68 | 4.65 | 42.18 | 14.79 | 21.11 | .010 |
| 221 | 4.61 | 17.37 | 4.27 | 41.83 | 14.47 | 20.80 | .011 |
| 248 | 4.35 | 17.11 | 4.04 | 41.53 | 14.18 | 20.48 | .009 |
| 276 | 4.25 | 17.00 | 3.94 | 41.37 | 14.00 | 20.28 | +.001 |
| 330 | 4.98 | 17.71 | 4.60 | 41.98 | 14.58 | 20.81 | .024 |
| 357 | 5.79 | 18.52 | 5.40 | 42.75 | 15.35 | 21.56 | +.033 |
| Dec. = | — 7° 58′ | — 11° 42′ | — 17° 25′ | — 8° 12′ | — 9° 36′ | — 12° 42′ |  |
| Mag. = | 6 | 6 | 5 | 6 | 4.5 | 5.4 |  |
|  | μ Virginis.<br>14<sup>h.</sup> 35<sup>m.</sup> | 5 Libræ.<br>14<sup>h.</sup> 38<sup>m.</sup> | μ Libræ.<br>14<sup>h.</sup> 41<sup>m.</sup> | α Libræ.<br>14<sup>h.</sup> 42<sup>m.</sup> | ξ² Libræ.<br>14<sup>h.</sup> 48<sup>m.</sup> | 20 Libræ.<br>14<sup>h.</sup> 55<sup>m.</sup> |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 2 | 27.41 | 0.45 | 24.62 | 53.87 | 56.30 | 37.59 | +.030 |
| 30 | 28.34 | 1.39 | 25.58 | 54.83 | 57.22 | 38.58 | .034 |
| 57 | 29.17 | 2.24 | 26 44 | 55.70 | 58.10 | 39.50 | .029 |
| 84 | 29.82 | 2.92 | 27.12 | 56.38 | 58.79 | 40.46 | .021 |
| 111 | 30.26 | 3.38 | 27.58 | 56.86 | 59.27 | 40.20 | .014 |
| 139 | 30.49 | 3.63 | 27.84 | 57.13 | 59.50 | 41.76 | .007 |
| 166 | 30.51 | 3.66 | 27.88 | 57.17 | 59.60 | 41.04 | .001 |
| 194 | 30.34 | 3.50 | 27.72 | 57.01 | 59.45 | 41.05 | —.008 |
| 222 | 30.03 | 3.18 | 27.40 | 56.69 | 59.14 | 40.70 | .013 |
| 249 | 29.69 | 2.83 | 27.05 | 56.33 | 58.78 | 40.31 | .012 |
| 277 | 29.46 | 2.58 | 26.81 | 56.08 | 58.53 | 40.00 | .004 |
| 331 | 29.88 | 3.03 | 27.22 | 56.50 | 58.90 | 40.38 | +.021 |
| 358 | 30.59 | 3.75 | 27.95 | 57.22 | 59.59 | 41.11 | +.031 |
| Dec. = | — 5° 2′ | — 14° 51′ | — 13° 33′ | — 15° 26′ | — 10° 50′ | — 24° 43′ |  |
| Mag. = | 4 | 6 | 6 | 2.3 | 6 | 3.4 |  |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
| | ι¹ Libræ.<br>$15^{\text{h.}}\ 3^{\text{m.}}$ | ζ¹ Libræ.<br>$15^{\text{h.}}\ 20^{\text{m.}}$ | γ Libræ.<br>$15^{\text{h.}}\ 27^{\text{m.}}$ | κ Libræ.<br>$15^{\text{h.}}\ 33^{\text{m.}}$ | η Libræ.<br>$15^{\text{h.}}\ 35^{\text{m.}}$ | λ Libræ.<br>$15^{\text{h.}}\ 44^{\text{m.}}$ | |
| d | s. | s. | s. | s. | s. | s. | |
| 3 | 59.86 | 7.05 | 27.08 | 37.88 | 57.20 | 57.37 | +.032 |
| 31 | 60.82 | 7.98 | 28.00 | 38.81 | 58 11 | 58.29 | .035 |
| 58 | 61.72 | 8.87 | 28.88 | 39.72 | 59.00 | 59.20 | .031 |
| 85 | 62.46 | 9.62 | 29.65 | 40.51 | 59.78 | 60.01 | .028 |
| 112 | 62.99 | 10.19 | 30.22 | 41.12 | 60.37 | 60.65 | .018 |
| 140 | 63.31 | 10.56 | 30.60 | 41.52 | 60.77 | 61.08 | +.010 |
| 167 | 63.40 | 10.68 | 30.74 | 41.69 | 60.94 | 61.28 | .000 |
| 195 | 63.28 | 10.58 | 30.65 | 41.61 | 60.87 | 61.23 | —.008 |
| 223 | 62.94 | 10.26 | 30.35 | 41.31 | 60.57 | 60.93 | .014 |
| 250 | 62.36 | 9.89 | 29.97 | 40.93 | 60.19 | 60.54 | .013 |
| 278 | 62.27 | 9.57 | 29.64 | 40.57 | 59.85 | 60.17 | —.008 |
| 305 | 62.24 | 9.51 | 29.56 | 40.48 | 59.75 | 60.07 | +.003 |
| 332 | 62.61 | 9.82 | 29.85 | 40.75 | 60.01 | 60.30 | +.018 |
| Dec. = | — 19° 15′ | — 16° 13′ | — 14° 19′ | — 19° 13′ | — 15° 13′ | — 19° 44′ | |
| Mag. = | 5.4 | 4 | 4.5 | 5 | 6 | 6 | |
| | ρ Scorpii.<br>$15^{\text{h.}}\ 47^{\text{m.}}$ | δ Scorpii.<br>$15^{\text{h.}}\ 51^{\text{m.}}$ | β¹ Scorpii.<br>$15^{\text{h.}}\ 57^{\text{m.}}$ | σ Scorpii.<br>$16^{\text{h.}}\ 12^{\text{m.}}$ | α Scorpii.<br>$16^{\text{h.}}\ 20^{\text{m.}}$ | τ Scorpii.<br>$16^{\text{h.}}\ 26^{\text{m.}}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 4 | 58.30 | 47.89 | 2.49 | 24.78 | 33.20 | 53.55 | +.031 |
| 31 | 59.27 | 48.79 | 3.39 | 25.69 | 34.10 | 54.44 | .036 |
| 59 | 60.29 | 49.77 | 4.32 | 26.69 | 35.09 | 55.46 | .035 |
| 86 | 61.14 | 50.58 | 5.16 | 27.54 | 35.98 | 56.35 | .028 |
| 113 | 61.82 | 51.23 | 5.80 | 27.25 | 36.72 | 57.11 | .021 |
| 141 | 62.29 | 51.69 | 6.27 | 28.79 | 37.28 | 57.70 | .014 |
| 168 | 62.50 | 51.90 | 6.49 | 29.05 | 37.57 | 58.01 | +.005 |
| 196 | 62.43 | 51.85 | 6.45 | 29.03 | 37.59 | 58.45 | —.008 |
| 224 | 62.10 | 51.54 | 6.17 | 28.76 | 37.32 | 57.76 | .014 |
| 251 | 61.66 | 51.14 | 5.76 | 28.34 | 36.89 | 57.34 | .017 |
| 278 | 61.28 | 50.76 | 5.39 | 27.94 | 36.48 | 56.91 | —.011 |
| 306 | 61.15 | 50.64 | 5.25 | 27.75 | 36.25 | 56.68 | +.001 |
| 333 | 61.41 | 50.88 | 5.45 | 27.94 | 36.41 | 56.84 | +.016 |
| Dec. = | — 28° 47′ | — 22° 12′ | — 19° 24′ | — 25° 14′ | — 26° 6′ | — 27° 55′ | |
| Mag. = | 5.4 | 2.3 | 2 | 3.4 | 1.2 | 3.4 | |
| | 24 Scorpii.<br>$16^{\text{h.}}\ 33^{\text{m.}}$ | 20 Ophiuchi.<br>$16^{\text{h.}}\ 41^{\text{m.}}$ | η Ophiuchi.<br>$17^{\text{h.}}\ 2^{\text{m.}}$ | A Ophiuchi.<br>$17^{\text{h.}}\ 6^{\text{m.}}$ | ξ Ophiuchi.<br>$17^{\text{h.}}\ 12^{\text{m.}}$ | θ Ophiuchi.<br>$17^{\text{h.}}\ 13^{\text{m.}}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 4 | 13.21 | 50.50 | 5.61 | 27.90 | 20.72 | 8.27 | +.025 |
| 32 | 14.06 | 51.40 | 6.40 | 28.74 | 21.51 | 9.08 | .033 |
| 60 | 15.00 | 52.30 | 7.31 | 29.69 | 22.44 | 10.03 | .033 |
| 87 | 15.84 | 53.12 | 8.16 | 30.62 | 23.32 | 10.94 | .031 |
| 114 | 16.56 | 53.84 | 8.92 | 31.44 | 24.12 | 11.76 | .025 |
| 142 | 17.11 | 54.37 | 9.53 | 32.12 | 24.78 | 12.45 | .018 |
| 169 | 17.40 | 54.67 | 9.90 | 32.53 | 25.18 | 12.87 | +.009 |
| 197 | 17.43 | 54.72 | 9.99 | 32.64 | 25.31 | 13.01 | —.002 |
| 224 | 17.20 | 54.49 | 9.80 | 32.44 | 25.13 | 12.83 | .012 |
| 252 | 16.78 | 54.09 | 9.41 | 32.04 | 24.73 | 12.42 | .017 |
| 279 | 16.37 | 53.68 | 8.98 | 31.56 | 24.28 | 11.96 | .014 |
| 306 | 16.17 | 53.47 | 8.72 | 31.26 | 24.00 | 11.67 | —.004 |
| 334 | 16.30 | 53.57 | 8.78 | 31.32 | 24.04 | 11.70 | +.010 |
| Dec. = | — 17° 28′ | — 10° 31′ | — 15° 33′ | — 26° 28′ | — 20° 57′ | — 24° 51′ | |
| Mag. = | 5 | 5 | 2.3 | 5 | 5 | 3.4 | |
| | b Ophiuchi.<br>$17^{\text{h.}}\ 17^{\text{m.}}$ | c² Ophiuchi.<br>$17^{\text{h.}}\ 22^{\text{m.}}$ | ο Serpentis.<br>$17^{\text{h.}}\ 33^{\text{m.}}$ | 4 Sagittarii.<br>$17^{\text{h.}}\ 50^{\text{m.}}$ | 9 Sagittarii.<br>$17^{\text{h.}}\ 55^{\text{m.}}$ | γ Sagittarii.<br>$17^{\text{h.}}\ 56^{\text{m.}}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 5 | 32.73 | 36.13 | 17.58 | 58.18 | 0.85 | 31.85 | +.023 |
| 33 | 33.55 | 36.94 | 18.31 | 59.92 | 1.59 | 32.61 | .030 |
| 60 | 34.46 | 37.84 | 19.14 | 59.79 | 2.45 | 33.52 | .033 |
| 88 | 35.40 | 38.78 | 20.02 | 60.73 | 3.39 | 34.52 | .032 |
| 115 | 36.23 | 39.61 | 20.71 | 61.59 | 4.26 | 35.43 | .030 |
| 142 | 36.89 | 40.28 | 21.45 | 62.32 | 5.00 | 36.23 | .022 |
| 170 | 37.33 | 40.74 | 21.90 | 62.85 | 5.55 | 36.80 | +.013 |
| 198 | 37.47 | 40.89 | 22.06 | 63.06 | 5.79 | 37.06 | .000 |
| 225 | 37.29 | 40.72 | 21.92 | 62.97 | 5.69 | 36.96 | —.010 |
| 253 | 36.88 | 40.31 | 21.54 | 62.60 | 5.32 | 36.56 | .017 |
| 280 | 36.41 | 39.85 | 21.10 | 62.13 | 4.84 | 36.06 | .017 |
| 307 | 36.12 | 39.55 | 20.80 | 61.78 | 4.49 | 35.68 | —.007 |
| 335 | 36.15 | 39.53 | 20.79 | 61.74 | 4.44 | 35.62 | +.005 |
| Dec. = | — 24° 2′ | — 23° 51′ | — 12° 48′ | — 23° 48′ | — 24° 22′ | — 30° 25′ | |
| Mag. = | 5 | 5 | 5.4 | 5 | 5.4 | 3.4 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
| | $\mu^1$ Sagittarii. $18^{h.}$ $5^{m.}$ | $\delta$ Sagittarii. $18^{h.}$ $11^{m.}$ | $\lambda$ Sagittarii. $18^{h.}$ $19^{m.}$ | Bradley 2333. $18^{h.}$ $25^{m.}$ | $\varphi$ Sagittarii. $18^{h.}$ $36^{m.}$ | 29 Sagittarii. $18^{h.}$ $41^{m.}$ | |
| d. | s. | s. | s. | s. | s. | s. | |
| 34 | 7.81 | 45.18 | 3.68 | 43.84 | 38.19 | 5.91 | +.028 |
| 61 | 8.64 | 46.06 | 4.53 | 44.66 | 39.02 | 6.68 | .034 |
| 88 | 9.56 | 46.91 | 5.45 | 45.56 | 39.94 | 7.55 | .034 |
| 116 | 10.41 | 47.97 | 6.37 | 46.48 | 40.89 | 8.45 | .032 |
| 143 | 11.15 | 48.83 | 7.17 | 47.27 | 41.75 | 9.25 | .026 |
| 170 | 11.69 | 49.37 | 7.76 | 47.87 | 42.36 | 9.87 | .018 |
| 198 | 11.95 | 49.66 | 8.06 | 48.18 | 42.72 | 10.22 | +.006 |
| 226 | 11.87 | 49.59 | 8.01 | 48.14 | 42.71 | 10.22 | —.008 |
| 253 | 11.52 | 49.23 | 8.67 | 47.82 | 42.40 | 9.93 | .016 |
| 281 | 11.05 | 48.71 | 7.18 | 47.34 | 41.92 | 9.47 | .017 |
| 308 | 10.70 | 48.32 | 6.80 | 46.96 | 41.51 | 9.08 | —.010 |
| 335 | 10.62 | 48.22 | 6.68 | 46.83 | 41.36 | 8.93 | +.001 |
| 362 | 10.89 | 48.51 | 6.98 | 47.07 | 41.57 | 9.11 | +.016 |
| Dec. = | — 21° 6′ | — 29° 53′ | — 25° 30′ | — 23° 37′ | — 27° 8′ | — 20° 29′ | |
| Mag. = | 4 | 3.4 | 3 | 6 | 4.3 | 6 | |
| | $\nu^1$ Sagittarii. $18^{h.}$ $45^{m.}$ | $\sigma$ Sagittarii. $18^{h.}$ $46^{m.}$ | $\zeta$ Sagittarii. $18^{h.}$ $53^{m.}$ | $\tau$ Sagittarii. $18^{h.}$ $57^{m.}$ | $\chi^1$ Sagittarii. $19^{h.}$ $16^{m.}$ | $h^2$ Sagittarii. $19^{h.}$ $27^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 34 | 26.92 | 18.86 | 25.33 | 55.41 | 29.04 | 54.91 | +.025 |
| 62 | 27.73 | 19.69 | 26.17 | 56.22 | 29.76 | 55.70 | .032 |
| 89 | 28.61 | 20.59 | 27.10 | 57.11 | 30.63 | 56.56 | .034 |
| 117 | 29.53 | 21.54 | 28.08 | 58.08 | 31.57 | 57.50 | .033 |
| 144 | 30.36 | 22.39 | 28.97 | 58.96 | 32.44 | 58.39 | .029 |
| 171 | 30.88 | 22.93 | 29.55 | 59.54 | 33.04 | 59.01 | .021 |
| 199 | 31.34 | 23.40 | 30.08 | 60.06 | 33.62 | 59.60 | +.007 |
| 227 | 31.33 | 23.40 | 30.07 | 60.10 | 33.67 | 59.72 | —.005 |
| 254 | 31.03 | 23.09 | 29.77 | 59.81 | 33.42 | 59.49 | .015 |
| 281 | 30.58 | 22.63 | 29.29 | 59.35 | 32.99 | 59.07 | .017 |
| 309 | 30.16 | 22.20 | 28.84 | 58.91 | 32.55 | 58.63 | .013 |
| 336 | 30.02 | 22.05 | 28.67 | 58.73 | 32.35 | 58.42 | —.001 |
| 363 | 30.21 | 22.24 | 28.83 | 58.86 | 32.44 | 58.47 | +.012 |
| Dec. = | — 22° 55′ | — 26° 28′ | — 30° 5′ | — 27° 53′ | — 24° 47′ | — 25° 12′ | |
| Mag. = | 5 | 2.3 | 3.4 | 4.3 | 6 | 5.4 | |
| | $e^2$ Sagittarii. $19^{h.}$ $34^{m.}$ | $f$ Sagittarii. $19^{h.}$ $37^{m.}$ | $b$ Sagittarii. $19^{h.}$ $48^{m.}$ | A Sagittarii. $19^{h.}$ $50^{m.}$ | $c$ Sagittarii. $19^{h.}$ $53^{m.}$ | Piazzi xix.366. $19^{h.}$ $55^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 35 | 15.43 | 56.17 | 4.83 | 8.93 | 46.36 | 10.03 | +.020 |
| 62 | 16.08 | 56.83 | 5.51 | 9.60 | 47.02 | 10.72 | .028 |
| 90 | 16.90 | 57.67 | 6.37 | 10.45 | 47.90 | 11.62 | .033 |
| 117 | 17.76 | 58.55 | 8.30 | 11.37 | 48.81 | 12.59 | .034 |
| 145 | 18.65 | 59.45 | 8.26 | 12.32 | 49.77 | 13.60 | .032 |
| 172 | 19.33 | 60.17 | 9.05 | 13.11 | 50.57 | 14.43 | .024 |
| 200 | 19.80 | 60.65 | 9.58 | 13.63 | 51.12 | 14.99 | +.013 |
| 227 | 19.90 | 60.76 | 9.73 | 13.80 | 51.30 | 15.18 | —.002 |
| 255 | 19.68 | 60.54 | 9.52 | 13.60 | 51.10 | 14.99 | .012 |
| 282 | 19.28 | 60.12 | 9.10 | 13.18 | 50.68 | 14.55 | .017 |
| 309 | 18.87 | 59.71 | 8.65 | 12.75 | 50.25 | 14.09 | .014 |
| 337 | 18.65 | 59.47 | 8.38 | 12.45 | 49.96 | 13.77 | —.003 |
| 364 | 18.71 | 59.52 | 8.41 | 12.49 | 49.98 | 13.79 | +.006 |
| Dec. = | — 16° 28′ | — 20° 6′ | — 27° 33′ | — 26° 35′ | — 28° 7′ | — 32° 27′ | |
| Mag. = | 5 | 5 | 5 | 5 | 5 | 5 | |
| | $\alpha^2$ Capricorni. $20^{h.}$ $10^{m.}$ | $\pi$ Capricorni. $20^{h.}$ $19^{m.}$ | $\varrho$ Capricorni. $20^{h.}$ $20^{m.}$ | $\nu$ Capricorni. $20^{h.}$ $31^{m.}$ | $\psi$ Capricorni. $20^{h.}$ $37^{m.}$ | $\omega$ Capricorni. $20^{h.}$ $43^{m.}$ | |
| | s. | s. | s. | s. | s. | s. | |
| 36 | 2.29 | 3.08 | 37.05 | 49.45 | 32.24 | 11.69 | +.016 |
| 63 | 2.85 | 3.72 | 37.68 | 50.05 | 32.86 | 12.29 | .024 |
| 91 | 3.60 | 4.33 | 38.29 | 50.65 | 33.47 | 12.90 | .031 |
| 118 | 4.44 | 5.35 | 39.30 | 51.65 | 34.51 | 13.95 | .033 |
| 145 | 5.28 | 6.25 | 40.19 | 52.53 | 35.44 | 14.89 | .034 |
| 173 | 6.06 | 7.04 | 41.00 | 53.36 | 36.32 | 15.79 | .027 |
| 201 | 6.59 | 7.53 | 41.50 | 53.91 | 36.88 | 16.36 | .015 |
| 228 | 6.76 | 7.81 | 41.77 | 54.20 | 37.23 | 16.74 | +.002 |
| 256 | 6.62 | 7.73 | 41.70 | 54.14 | 37.16 | 16.71 | —.007 |
| 283 | 6.27 | 7.33 | 41.29 | 53.77 | 36.79 | 16.33 | .016 |
| 310 | 5.87 | 6.91 | 40.88 | 53.35 | 36.37 | 15.89 | .015 |
| 338 | 5.60 | 6.61 | 40.60 | 53.06 | 36.04 | 15.55 | —.007 |
| 365 | 5.59 | 6.59 | 40.56 | 53.00 | 35.96 | 15.46 | +.003 |
| Dec. = | — 12° 59′ | — 18° 41′ | — 18° 17′ | — 18° 39′ | — 25° 47′ | — 27° 27′ | |
| Mag. = | 3.4 | 5 | 5 | 6.5 | 4.5 | 4.5 | |

| Sidereal Date. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Name and R.A. of Star. | Daily Change. |
|---|---|---|---|---|---|---|---|
|  | ν Aquarii.<br>21$^{\text{h.}}$ 1$^{\text{m.}}$ | ι Capricorni.<br>21$^{\text{h.}}$ 14$^{\text{m.}}$ | ζ Capricorni.<br>21$^{\text{h.}}$ 18$^{\text{m.}}$ | ε Capricorni.<br>21$^{\text{h.}}$ 28$^{\text{m.}}$ | γ Capricorni.<br>21$^{\text{h.}}$ 32$^{\text{m}}$. | δ Capricorni.<br>21$^{\text{h.}}$ 39$^{\text{m.}}$ |  |
| d | s. | s. | s. | s. | s. | s. |  |
| 37 | 43.35 | 11.99 | 25.00 | 59.45 | 5.16 | 3.96 | +.012 |
| 64 | 43.77 | 12.39 | 25.41 | 59.83 | 5.52 | 4.30 | .018 |
| 91 | 44.41 | 13.02 | 26.06 | 60.43 | 6.10 | 4.86 | .027 |
| 119 | 45.25 | 13.86 | 26.91 | 61.25 | 6.91 | 5.66 | .032 |
| 146 | 46.11 | 14.76 | 27.83 | 62.15 | 7.80 | 6.54 | .033 |
| 173 | 46.96 | 15.63 | 28.74 | 63.06 | 8.70 | 7.45 | .029 |
| 201 | 47.57 | 16.28 | 29.43 | 63.75 | 9.39 | 8.15 | .019 |
| 229 | 47.88 | 16.63 | 29.81 | 64.15 | 9.79 | 8.56 | +.008 |
| 256 | 47.85 | 16.64 | 29.83 | 64.20 | 9.84 | 8.64 | —.006 |
| 284 | 47.55 | 16.37 | 29.55 | 63.95 | 9.60 | 8.41 | .013 |
| 311 | 47.17 | 15.99 | 29.15 | 63.58 | 9.25 | 8.07 | .014 |
| 338 | 46.87 | 15.67 | 28.81 | 63.24 | 8.92 | 7.74 | .009 |
| 366 | 46.77 | 15.53 | 28.66 | 63.07 | 8.75 | 7.55 | —.001 |
| Dec. = | — 11° 57′ | — 17° 27′ | — 23° 2′ | — 20° 6′ | — 17° 19′ | — 16° 47′ |  |
| Mag. = | 4.5 | 4.5 | 4 | 5.4 | 4.3 | 3 |  |
|  | μ Capricorni.<br>21$^{\text{h.}}$ 45$^{\text{m.}}$ | ι Aquarii.<br>21$^{\text{h.}}$ 58$^{\text{m.}}$ | θ Aquarii.<br>22$^{\text{h.}}$ 9$^{\text{m.}}$ | ϱ Aquarii.<br>22$^{\text{h.}}$ 12$^{\text{m.}}$ | $53^2$ Aquarii.<br>22$^{\text{h.}}$ 18$^{\text{m.}}$ | σ Aquarii.<br>22$^{\text{h.}}$ 23$^{\text{m.}}$ |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 38 | 25.16 | 38.02 | 12.65 | 35.89 | 43.84 | 0.04 | +.004 |
| 65 | 25.46 | 38.29 | 12.88 | 36.11 | 44.06 | 0.24 | .011 |
| 92 | 26.04 | 38.82 | 13.37 | 36.59 | 44.53 | 0.69 | .023 |
| 120 | 26.82 | 39.48 | 14.10 | 37.31 | 45.27 | 1.41 | .030 |
| 147 | 27.69 | 40.45 | 14.94 | 38.15 | 46.13 | 2.24 | .033 |
| 174 | 28.56 | 41.32 | 15.21 | 39.02 | 47.04 | 3.12 | .031 |
| 202 | 29.29 | 42.06 | 16.57 | 39.77 | 47.83 | 3.90 | .023 |
| 229 | 29.71 | 42.52 | 17.02 | 40.23 | 48.33 | 4.39 | +.011 |
| 257 | 29.78 | 42.64 | 17.16 | 40.39 | 48.51 | 4.58 | —.002 |
| 285 | 29.57 | 42.45 | 17.00 | 40.24 | 48.37 | 4.45 | .009 |
| 312 | 29.22 | 42.12 | 16.70 | 39.94 | 48.06 | 4.16 | .012 |
| 339 | 28.91 | 41.80 | 16.39 | 39.62 | 47.74 | 3.85 | .010 |
| 366 | 28.73 | 41.60 | 16.17 | 39.41 | 47.51 | 3.62 | —.004 |
| Dec. = | — 14° 14′ | — 14° 34′ | — 8° 30′ | — 8° 33′ | — 17° 28′ | — 11° 25′ |  |
| Mag. = | 5 | 4 | 4.5 | 5.6 | 6 | 5.4 |  |
|  | ϰ Aquarii.<br>22$^{\text{h.}}$ 30$^{\text{m.}}$ | $\tau^2$ Aquarii.<br>22$^{\text{h.}}$ 41$^{\text{m.}}$ | δ Aquarii.<br>22$^{\text{h.}}$ 46$^{\text{m.}}$ | φ Aquarii.<br>23$^{\text{h.}}$ 6$^{\text{m.}}$ | $\psi^1$ Aquarii.<br>23$^{\text{h.}}$ 8$^{\text{m.}}$ | $\psi^3$ Aquarii.<br>23$^{\text{h}}$. 11$^{\text{m.}}$ |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 38 | 16.49 | 56.62 | 58.95 | 50.66 | 19.37 | 26.97 | +.000 |
| 65 | 16.67 | 56.78 | 59.09 | 50.74 | 19.45 | 27.03 | .008 |
| 93 | 17.08 | 57.21 | 59.50 | 51.10 | 19.83 | 27.37 | .018 |
| 120 | 17.78 | 57.84 | 60.13 | 51.66 | 20.37 | 27.94 | .023 |
| 148 | 18.65 | 58.73 | 61.02 | 52.50 | 21.22 | 28.78 | .033 |
| 175 | 19.51 | 59.62 | 61.92 | 53.37 | 22.10 | 29.65 | .032 |
| 203 | 20.28 | 60.43 | 62.73 | 54.19 | 22.94 | 30.49 | .025 |
| 230 | 20.77 | 60.96 | 63.30 | 54.76 | 23.51 | 31.07 | .016 |
| 258 | 20.94 | 61.18 | 63.53 | 55.04 | 23.80 | 31.37 | +.003 |
| 285 | 20.85 | 61.11 | 63.47 | 55.03 | 23.81 | 31.37 | —.006 |
| 313 | 20.56 | 60.83 | 63.20 | 54.82 | 23.59 | 31.16 | .012 |
| 340 | 20.25 | 60.51 | 62.88 | 54.53 | 23.30 | 30.88 | .011 |
| 367 | 20.02 | 60.27 | 62.62 | 54.28 | 23.04 | 30.61 | —.007 |
| Dec. = | — 4° 58′ | — 14° 22′ | — 16° 36′ | — 6° 50′ | — 9° 53′ | — 10° 24′ |  |
| Mag. = | 5 | 4 | 3 | 4.5 | 5.4 | 5 |  |
|  | ϰ Piscium.<br>23$^{\text{h.}}$ 19$^{\text{m.}}$ | λ Piscium.<br>23$^{\text{h.}}$ 34$^{\text{m.}}$ | 20 Piscium.<br>23$^{\text{h.}}$ 40$^{\text{m.}}$ | 27 Piscium.<br>23$^{\text{h.}}$ 51$^{\text{m.}}$ | 30 Piscium.<br>23$^{\text{h.}}$ 54$^{\text{m.}}$ | 33 Piscium.<br>23$^{\text{h.}}$ 57$^{\text{m.}}$ |  |
|  | s. | s. | s. | s. | s. | s. |  |
| 12 | 32.07 | 41.01 | 31.40 | 17.22 | 33.62 | 57.10 | —.008 |
| 39 | 31.94 | 40.86 | 31.24 | 17.04 | 33.43 | 56.91 | —.004 |
| 66 | 32.00 | 40.87 | 31.24 | 17.00 | 33.39 | 56.86 | +.003 |
| 94 | 32.31 | 41.14 | 31.50 | 17.24 | 33.61 | 57.08 | .014 |
| 121 | 32.87 | 41.67 | 32.01 | 17.72 | 34.10 | 57.54 | .023 |
| 149 | 33.70 | 42.46 | 32.79 | 18.49 | 34.85 | 58.32 | .029 |
| 176 | 34.56 | 43.33 | 33.66 | 19.36 | 35.72 | 59.17 | .033 |
| 204 | 35.39 | 44.18 | 34.52 | 20.22 | 36.59 | 60.04 | .029 |
| 231 | 35.97 | 44.78 | 35.14 | 20.89 | 37.25 | 60.70 | .020 |
| 259 | 36.27 | 45.12 | 35.50 | 21.25 | 37.64 | 61.10 | +.007 |
| 286 | 36.28 | 45.17 | 35 56 | 21.35 | 37.75 | 61.22 | —.001 |
| 314 | 36.09 | 45.01 | 35.43 | 21.22 | 37.63 | 61.10 | .008 |
| 341 | 35.81 | 44.75 | 35.17 | 20.98 | 37.39 | 60.88 | —.010 |
| Dec. = | + 0° 28′ | + 0° 59′ | — 3° 34′ | — 4° 21′ | — 6° 49′ | — 6° 31′ |  |
| Mag. = | 5.4 | 5 | 6 | 5.6 | 5 | 5 |  |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

| | JANUARY. | | | | | FEBRUARY. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 15 1.2 | 55 0.9 | +1.33 | L. 6 58.8 | 1.75 | 15 36.0 | 57 8.5 | +2.28 | L. 8 2.9 | 2.35 |
| 1.5 | 15 5.9 | 55 17.9 | 1.51 | U. 19 20.2 | 1.82 | 15 43.6 | 57 36.4 | 2.35 | U. 20 31.8 | 2.45 |
| 2.0 | 15 11.1 | 55 37.0 | 1.68 | L. 7 42.4 | 1.89 | 15 51.3 | 58 4.9 | 2.37 | L. 9 1.7 | 2.53 |
| 2.5 | 15 16.8 | 55 58.0 | 1.82 | U. 20 5.6 | 1.98 | 15 59.0 | 58 33.4 | 2.36 | U. 21 32.5 | 2.58 |
| 3.0 | 15 22.9 | 56 20.5 | 1.93 | L. 8 30.0 | 2.08 | 16 6.6 | 59 1.3 | 2.27 | L. 10 3.9 | 2.62 |
| 3.5 | 15 29.4 | 56 44.3 | 2.02 | U. 20 55.6 | 2.19 | 16 13.9 | 59 27.8 | 2.13 | U. 22 35.4 | 2.62 |
| 4.0 | 15 36.1 | 57 9.0 | 2.07 | L. 9 22.5 | 2.29 | 16 20.6 | 59 52.2 | 1.94 | L. 11 6.8 | 2.60 |
| 4.5 | 15 43.0 | 57 34.2 | 2.08 | U. 21 50.7 | 2.40 | 16 26.5 | 60 14.0 | 1.69 | U. 23 37.7 | 2.54 |
| 5.0 | 15 49.8 | 57 59.1 | 2.05 | L. 10 20.2 | 2.50 | 16 31.5 | 60 32.5 | 1.39 | | |
| 5.5 | 15 56.4 | 58 23.3 | 1.98 | U. 22 50.7 | 2.57 | 16 35.4 | 60 47.2 | 1.05 | L. 12 7.8 | 2.48 |
| 6.0 | 16 2.7 | 58 46.4 | 1.86 | L. 11 21.9 | 2.62 | 16 38.3 | 60 57.7 | 0.69 | U. 0 37.1 | 2.41 |
| 6.5 | 16 8.5 | 59 7.8 | 1.70 | U. 23 53.5 | 2.63 | 16 40.0 | 61 3.6 | +0.31 | L. 13 5.5 | 2.33 |
| 7.0 | 16 13.7 | 59 26.9 | 1.48 | | | 16 40.4 | 61 5.0 | —0.08 | U. 1 32.9 | 2.25 |
| 7.5 | 16 18.1 | 59 43.3 | 1.24 | L. 12 25.1 | 2.62 | 16 39.5 | 61 1.7 | 0.45 | L. 13 59.4 | 2.18 |
| 8.0 | 16 21.8 | 59 56.7 | 0.98 | U. 0 56.3 | 2.57 | 16 37.4 | 60 54.1 | 0.79 | U. 2 25.3 | 2.14 |
| 8.5 | 16 24.5 | 60 6.8 | 0.68 | L. 13 26.9 | 2.51 | 16 34.3 | 60 42.5 | 1.10 | L. 14 50.7 | 2.10 |
| 9.0 | 16 26.2 | 60 13.2 | 0.39 | U. 1 56.5 | 2.43 | 16 30.3 | 60 27.5 | 1.37 | U. 3 15.7 | 2.07 |
| 9.5 | 16 27.1 | 60 16.2 | +0.11 | L. 14 25.1 | 2.34 | 16 25.4 | 60 9.5 | 1.59 | L. 15 40.4 | 2.06 |
| 10.0 | 16 27.0 | 60 15.8 | —0.17 | U. 2 52.7 | 2.26 | 16 19.7 | 59 49.0 | 1.77 | U. 4 5.1 | 2.07 |
| 10.5 | 16 26.0 | 60 12.1 | 0.43 | L. 15 19.3 | 2.18 | 16 13.6 | 59 26.8 | 1.89 | L. 16 29.9 | 2.08 |
| 11.0 | 16 24.2 | 60 5.5 | 0.66 | U. 3 45.1 | 2.11 | 16 7.3 | 59 3.4 | 1.97 | U. 4 55.0 | 2.10 |
| 11.5 | 16 21.6 | 59 56.2 | 0.87 | L. 16 10.0 | 2.06 | 16 0.8 | 58 39.4 | 2.00 | L. 17 20.4 | 2.13 |
| 12.0 | 16 18.5 | 59 44.7 | 1.03 | U. 4 34.5 | 2.02 | 15 54.3 | 58 15.3 | 2.00 | U. 5 46.3 | 2.17 |
| 12.5 | 16 14.9 | 59 31.4 | 1.17 | L. 16 58.5 | 2.00 | 15 47.8 | 57 51.5 | 1.96 | L. 18 12.6 | 2.21 |
| 13.0 | 16 10.9 | 59 16.7 | 1.27 | U. 5 22.4 | 1.99 | 15 41.4 | 57 28.4 | 1.89 | U. 6 39.4 | 2.25 |
| 13.5 | 16 6.6 | 59 1.0 | 1.33 | L. 17 46.2 | 1.99 | 15 35.3 | 57 6.2 | 1.81 | L. 19 6.7 | 2.28 |
| 14.0 | 16 2.2 | 58 44.7 | 1.37 | U. 6 10.1 | 2.01 | 15 29.6 | 56 45.0 | 1.71 | U. 7 34.2 | 2.30 |
| 14.5 | 15 57.7 | 58 28.0 | 1.40 | L. 18 34.4 | 2.04 | 15 24.2 | 56 25.1 | 1.61 | L. 20 1.9 | 2.31 |
| 15.0 | 15 53.1 | 58 11.2 | 1.40 | U. 6 59.0 | 2.08 | 15 19.1 | 56 6.6 | 1.49 | U. 8 29.6 | 2.30 |
| 15.5 | 15 48.5 | 57 54.4 | 1.39 | L. 19 24.2 | 2.12 | 15 14.4 | 55 49.3 | 1.38 | L. 20 57.1 | 2.28 |
| 16.0 | 15 43.9 | 57 37.8 | 1.37 | U. 7 50.0 | 2.17 | 15 10.1 | 55 33.4 | 1.27 | U. 9 24.1 | 2.23 |
| 16.5 | 15 39.4 | 57 21.5 | 1.35 | L. 20 16.4 | 2.22 | 15 6.2 | 55 18.9 | 1.17 | L. 21 50.5 | 2.17 |
| 17.0 | 15 35.1 | 57 5.5 | 1.32 | U. 8 43.3 | 2.26 | 15 2.6 | 55 5.6 | 1.06 | U. 10 16.3 | 2.11 |
| 17.5 | 15 30.9 | 56 49.8 | 1.29 | L. 21 10.7 | 2.30 | 14 59.3 | 54 53.5 | 0.95 | L. 22 41.3 | 2.04 |
| 18.0 | 15 26.8 | 56 34.4 | 1.26 | U. 9 38.5 | 2.32 | 14 56.3 | 54 42.7 | 0.85 | U. 11 5.3 | 1.97 |
| 18.5 | 15 22.7 | 56 19.4 | 1.23 | L. 22 6.4 | 2.32 | 14 53.7 | 54 33.1 | 0.75 | L. 23 28.5 | 1.90 |
| 19.0 | 15 18.7 | 56 4.9 | 1.20 | U. 10 34.2 | 2.30 | 14 51.4 | 54 24.7 | 0.65 | U. 11 50.9 | 1.84 |
| 19.5 | 15 14.9 | 55 50.8 | 1.16 | L. 23 1.7 | 2.27 | 14 49.4 | 54 17.5 | 0.55 | | |
| 20.0 | 15 11.2 | 55 37.1 | 1.11 | U. 11 28.7 | 2.22 | 14 47.8 | 54 11.5 | 0.45 | L. 0 12.6 | 1.78 |
| 20.5 | 15 7.6 | 55 24.1 | 1.07 | L. 23 55.0 | 2.16 | 14 46.5 | 54 6.6 | 0.35 | U. 12 33.7 | 1.73 |
| 21.0 | 15 4.1 | 55 11.6 | 1.01 | | | 14 45.5 | 54 2.9 | 0.25 | L. 0 54.2 | 1.69 |
| 21.5 | 15 0.9 | 54 59.9 | 0.95 | U. 12 20.5 | 2.09 | 14 44.8 | 54 0.6 | 0.14 | U. 13 14.2 | 1.66 |
| 22.0 | 14 58.0 | 54 48.9 | 0.87 | L. 0 45.2 | 2.02 | 14 44.5 | 53 59.6 | —0.02 | L. 1 33.9 | 1.63 |
| 22.5 | 14 55.3 | 54 38.9 | 0.79 | U. 13 8.9 | 1.94 | 14 44.6 | 54 0.1 | +0.10 | U. 13 53.4 | 1.62 |
| 23.0 | 14 52.8 | 54 29.9 | 0.70 | L. 1 31.8 | 1.87 | 14 45.2 | 54 2.1 | 0.23 | L. 2 12.8 | 1.62 |
| 23.5 | 14 50.7 | 54 22.0 | 0.60 | U. 13 53.8 | 1.81 | 14 46.2 | 54 5.8 | 0.37 | U. 14 32.3 | 1.63 |
| 24.0 | 14 48.9 | 54 15.5 | 0.48 | L. 2 15.2 | 1.75 | 14 47.7 | 54 11.1 | 0.52 | L. 2 51.9 | 1.65 |
| 24.5 | 14 47.5 | 54 10.4 | 0.36 | U. 14 35.9 | 1.71 | 14 49.6 | 54 18.3 | 0.68 | U. 15 11.9 | 1.68 |
| 25.0 | 14 46.6 | 54 7.0 | 0.22 | L. 2 56.0 | 1.67 | 14 52.1 | 54 27.5 | 0.85 | L. 3 32.3 | 1.73 |
| 25.5 | 14 46.2 | 54 5.4 | —0.05 | U. 15 15.8 | 1.64 | 14 55.2 | 54 38.6 | 1.02 | U. 15 53.3 | 1.78 |
| 26.0 | 14 46.2 | 54 5.6 | +0.11 | L. 3 35.4 | 1.63 | 14 58.8 | 54 51.8 | 1.19 | L. 4 15.1 | 1.85 |
| 26.5 | 14 46.8 | 54 8.0 | 0.29 | U. 15 54.8 | 1.62 | 15 3.0 | 55 7.2 | 1.37 | U. 16 37.7 | 1.93 |
| 27.0 | 14 48.0 | 54 12.6 | 0.47 | L. 4 14.3 | 1.63 | 15 7.7 | 55 24.8 | 1.56 | L. 5 1.3 | 2.01 |
| 27.5 | 14 49.9 | 54 19.6 | 0.67 | U. 16 33.9 | 1.65 | 15 13.1 | 55 44.6 | 1.73 | U. 17 26.0 | 2.10 |
| 28.0 | 14 52.5 | 54 28.9 | 0.88 | L. 4 53.9 | 1.68 | 15 19.1 | 56 6.5 | 1.91 | L. 5 51.8 | 2.20 |
| 28.5 | 14 55.7 | 54 40.8 | 1.09 | U. 17 14.4 | 1.72 | 15 25.6 | 56 30.3 | 2.06 | U. 18 18.8 | 2.29 |
| 29.0 | 14 59.6 | 54 55.1 | 1.29 | L. 5 35.4 | 1.78 | 15 32.6 | 56 55.9 | 2.20 | L. 6 46.8 | 2.38 |
| 29.5 | 15 4.2 | 55 11.9 | 1.50 | U. 17 57.2 | 1.86 | 15 40.0 | 57 23.2 | 2.32 | U. 19 15.9 | 2.47 |
| 30.0 | 15 9.4 | 55 31.1 | 1.69 | L. 6 20.0 | 1.94 | 15 47.7 | 57 51.5 | 2.38 | L. 7 45.8 | 2.51 |
| 30.5 | 15 15.3 | 55 52.6 | 1.87 | U. 18 43.9 | 2.04 | 15 55.6 | 58 20.5 | 2.43 | U. 20 16.1 | 2.54 |
| 31.0 | 15 21.8 | 56 16.3 | 2.04 | L. 7 9.0 | 2.14 | 16 3.5 | 58 49.7 | 2.41 | L. 8 46.7 | 2.55 |
| 31.5 | 15 28.7 | 56 41.6 | +2.17 | U. 19 35.3 | 2.24 | 16 11.3 | 59 18.4 | +2.34 | U. 21 17.3 | 2.54 |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

|  | MARCH. |  |  |  |  | APRIL. |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| Date. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 15 47.7 | 57 51.5 | +2.38 | L. 7 45.8 | 2.51 | 16 25.1 | 60 8.7 | +1.82 | L. 9 26.1 | 2.26 |
| 1.5 | 15 55.6 | 58 20.5 | 2.43 | U. 20 16.1 | 2.54 | 16 30.7 | 60 29.3 | 1.59 | U. 21 52.9 | 2.22 |
| 2.0 | 16 3.5 | 58 49.7 | 2.41 | L. 8 46.7 | 2.55 | 16 35.4 | 60 46.8 | 1.31 | L. 10 19.3 | 2.18 |
| 2.5 | 16 11.3 | 59 18.4 | 2.34 | U. 21 17.3 | 2.54 | 16 39.2 | 61 0.7 | 0.99 | U. 22 45.3 | 2.16 |
| 3.0 | 16 18.8 | 59 45.8 | 2.21 | L. 9 47.6 | 2.50 | 16 41.9 | 61 10.5 | 0.63 | L. 11 11.1 | 2.15 |
| 3.5 | 16 25.8 | 60 11.3 | 2.02 | U. 22 17.3 | 2.45 | 16 43.4 | 61 15.9 | +0.24 | U. 23 36.8 | 2.14 |
| 4.0 | 16 32.0 | 60 34.2 | 1.76 | L. 10 46.4 | 2.39 | 16 43.5 | 61 16.5 | —0.16 |  |  |
| 4.5 | 16 37.3 | 60 53.6 | 1.45 | U. 23 14.7 | 2.33 | 16 42.3 | 61 12.1 | 0.56 | L. 12 2.5 | 2.15 |
| 5.0 | 16 41.5 | 61 9.0 | 1.10 | L. 11 42.3 | 2.27 | 16 39.8 | 61 3.0 | 0.95 | U. 0 28.5 | 2.18 |
| 5.5 | 16 44.4 | 61 19.9 | 0.71 |  |  | 16 36.1 | 60 49.4 | 1.30 | L. 12 54.8 | 2.21 |
| 6.0 | 16 46.1 | 61 26.0 | +0.30 | U. 0 9.2 | 2.22 | 16 31.3 | 60 31.8 | 1.62 | U. 1 21.6 | 2.26 |
| 6.5 | 16 46.4 | 61 27.0 | —0.13 | L. 12 35.6 | 2.18 | 16 25.6 | 60 10.6 | 1.89 | L. 13 49.0 | 2.30 |
| 7.0 | 16 45.3 | 61 22.9 | 0.54 | U. 1 1.6 | 2.15 | 16 19.1 | 59 46.5 | 2.10 | U. 2 16.9 | 2.35 |
| 7.5 | 16 42.9 | 61 14.0 | 0.93 | L. 13 27.3 | 2.14 | 16 11.9 | 59 20.3 | 2.25 | L. 14 45.4 | 2.39 |
| 8.0 | 16 39.2 | 61 0.5 | 1.29 | U. 1 52.9 | 2.14 | 16 4.3 | 58 52.5 | 2.35 | U. 3 14.3 | 2.42 |
| 8.5 | 16 34.4 | 60 42.9 | 1.61 | L. 14 18.6 | 2.15 | 15 56.5 | 58 23.8 | 2.40 | L. 15 43.6 | 2.44 |
| 9.0 | 16 28.6 | 60 21.8 | 1.88 | U. 2 44.4 | 2.17 | 15 48.6 | 57 54.9 | 2.39 | U. 4 12.9 | 2.44 |
| 9.5 | 16 22.1 | 59 57.8 | 2.09 | L. 15 10.6 | 2.20 | 15 40.9 | 57 26.5 | 2.34 | L. 16 42.1 | 2.42 |
| 10.0 | 16 15.0 | 59 31.7 | 2.23 | U. 3 37.1 | 2.23 | 15 33.4 | 56 58.9 | 2.25 | U. 5 10.9 | 2.38 |
| 10.5 | 16 7.5 | 59 4.3 | 2.31 | L. 16 4.1 | 2.27 | 15 26.2 | 56 32.6 | 2.13 | L. 17 39.1 | 2.32 |
| 11.0 | 15 59.9 | 58 36.2 | 2.35 | U. 4 31.6 | 2.30 | 15 19.5 | 56 7.9 | 1.98 | U. 6 6.5 | 2.25 |
| 11.5 | 15 52.2 | 58 7.9 | 2.34 | L. 16 59.4 | 2.33 | 15 13.3 | 55 45.1 | 1.81 | L. 18 33.0 | 2.17 |
| 12.0 | 15 44.6 | 57 40.0 | 2.29 | U. 5 27.5 | 2.35 | 15 7.7 | 55 24.5 | 1.62 | U. 6 58.6 | 2.09 |
| 12.5 | 15 37.2 | 57 13.0 | 2.20 | L. 17 55.8 | 2.36 | 15 2.7 | 55 6.2 | 1.43 | L. 19 23.1 | 2.00 |
| 13.0 | 15 30.2 | 56 47.3 | 2.08 | U. 6 24.1 | 2.35 | 14 58.3 | 54 50.2 | 1.24 | U. 7 46.6 | 1.92 |
| 13.5 | 15 23.7 | 56 23.2 | 1.94 | L. 18 52.1 | 2.32 | 14 54.6 | 54 36.5 | 1.05 | L. 20 9.2 | 1.85 |
| 14.0 | 15 17.6 | 56 0.8 | 1.79 | U. 7 19.7 | 2.28 | 14 51.5 | 54 25.1 | 0.86 | U. 8 31.0 | 1.79 |
| 14.5 | 15 12.0 | 55 40.2 | 1.63 | L. 19 46.7 | 2.22 | 14 49.0 | 54 16.0 | 0.67 | L. 20 52.1 | 1.73 |
| 15.0 | 15 6.9 | 55 21.7 | 1.46 | U. 8 13.0 | 2.15 | 14 47.1 | 54 9.1 | 0.48 | U. 9 12.6 | 1.69 |
| 15.5 | 15 2.4 | 55 5.2 | 1.30 | L. 20 38.4 | 2.08 | 14 45.8 | 54 4.4 | 0.31 | L. 21 32.7 | 1.66 |
| 16.0 | 14 58.4 | 54 50.6 | 1.14 | U. 9 2.9 | 2.00 | 14 45.1 | 54 1.7 | —0.15 | U. 9 52.4 | 1.63 |
| 16.5 | 14 55.0 | 54 37.9 | 0.98 | L. 21 26.5 | 1.93 | 14 44.9 | 54 0.9 | +0.01 | L. 22 11.9 | 1.62 |
| 17.0 | 14 52.1 | 54 27.1 | 0.83 | U. 9 49.3 | 1.87 | 14 45.2 | 54 1.9 | 0.15 | U. 10 31.3 | 1.62 |
| 17.5 | 14 49.6 | 54 18.1 | 0.68 | L. 22 11.3 | 1.81 | 14 45.9 | 54 4.5 | 0.28 | L. 22 50.8 | 1.63 |
| 18.0 | 14 47.6 | 54 10.9 | 0.53 | U. 10 32.7 | 1.75 | 14 47.0 | 54 8.6 | 0.40 | U. 11 10.4 | 1.65 |
| 18.5 | 14 46.1 | 54 5.3 | 0.40 | L. 22 53.4 | 1.70 | 14 48.5 | 54 14.2 | 0.52 | L. 23 30.4 | 1.69 |
| 19.0 | 14 45.0 | 54 1.3 | 0.27 | U. 11 13.6 | 1.67 | 14 50.4 | 54 21.1 | 0.62 | U. 11 50.9 | 1.73 |
| 19.5 | 14 44.3 | 53 58.8 | 0.15 | L. 23 33.4 | 1.64 | 14 52.6 | 54 29.2 | 0.72 |  |  |
| 20.0 | 14 44.0 | 53 57.7 | —0.03 | U. 11 53.0 | 1.63 | 14 55.1 | 54 38.4 | 0.81 | L. 0 11.9 | 1.78 |
| 20.5 | 14 44.1 | 53 58.0 | +0.08 |  |  | 14 57.9 | 54 48.7 | 0.90 | U. 12 33.6 | 1.84 |
| 21.0 | 14 44.6 | 53 59.7 | 0.19 | L. 0 12.5 | 1.62 | 15 1.0 | 54 59.9 | 0.98 | L. 0 56.1 | 1.91 |
| 21.5 | 14 45.4 | 54 2.6 | 0.29 | U. 12 31.9 | 1.62 | 15 4.3 | 55 12.1 | 1.05 | U. 13 19.5 | 1.99 |
| 22.0 | 14 46.5 | 54 6.7 | 0.40 | L. 0 51.4 | 1.64 | 15 7.8 | 55 25.1 | 1.12 | L. 1 43.8 | 2.07 |
| 22.5 | 14 48.0 | 54 12.2 | 0.52 | U. 13 11.2 | 1.67 | 15 11.6 | 55 39.0 | 1.20 | U. 14 9.1 | 2.15 |
| 23.0 | 14 49.9 | 54 19.1 | 0.63 | L. 1 31.4 | 1.70 | 15 15.6 | 55 53.8 | 1.27 | L. 2 35.4 | 2.23 |
| 23.5 | 14 52.2 | 54 27.4 | 0.75 | U. 13 52.1 | 1.75 | 15 19.9 | 56 9.4 | 1.33 | U. 15 2.6 | 2.30 |
| 24.0 | 14 54.8 | 54 37.1 | 0.87 | L. 2 13.4 | 1.80 | 15 24.4 | 56 25.8 | 1.40 | L. 3 30.6 | 2.35 |
| 24.5 | 14 57.8 | 54 48.2 | 0.99 | U. 14 35.4 | 1.87 | 15 29.0 | 56 43.0 | 1.46 | U. 15 59.1 | 2.39 |
| 25.0 | 15 1.2 | 55 0.7 | 1.11 | L. 2 58.2 | 1.94 | 15 33.9 | 57 1.0 | 1.52 | L. 4 28.0 | 2.41 |
| 25.5 | 15 5.0 | 55 14.8 | 1.24 | U. 15 22.0 | 2.02 | 15 39.0 | 57 19.7 | 1.58 | U. 16 57.0 | 2.41 |
| 26.0 | 15 9.3 | 55 30.5 | 1.37 | L. 3 46.8 | 2.11 | 15 44.3 | 57 39.0 | 1.63 | L. 5 25.8 | 2.39 |
| 26.5 | 15 14.0 | 55 47.8 | 1.51 | U. 16 12.6 | 2.19 | 15 49.7 | 57 58.8 | 1.66 | U. 17 54.3 | 2.36 |
| 27.0 | 15 19.2 | 56 6.8 | 1.65 | L. 4 39.4 | 2.27 | 15 55.1 | 58 18.9 | 1.68 | L. 6 22.4 | 2.32 |
| 27.5 | 15 24.8 | 56 27.3 | 1.78 | U. 17 7.1 | 2.34 | 16 0.6 | 58 39.1 | 1.68 | U. 18 49.9 | 2.27 |
| 28.0 | 15 30.8 | 56 49.3 | 1.90 | L. 5 35.6 | 2.40 | 16 6.1 | 58 59.2 | 1.65 | L. 7 16.8 | 2.22 |
| 28.5 | 15 37.2 | 57 12.8 | 2.01 | U. 18 4.7 | 2.44 | 16 11.4 | 59 18.7 | 1.58 | U. 19 43.1 | 2.17 |
| 29.0 | 15 43.9 | 57 37.5 | 2.10 | L. 6 34.1 | 2.46 | 16 16.4 | 59 37.1 | 1.47 | L. 8 8.8 | 2.13 |
| 29.5 | 15 50.9 | 58 3.1 | 2.15 | U. 19 3.7 | 2.46 | 16 21.0 | 59 54.0 | 1.32 | U. 20 34.1 | 2.10 |
| 30.0 | 15 58.0 | 58 29.2 | 2.17 | L. 7 33.1 | 2.44 | 16 25.1 | 60 8.8 | 1.13 | L. 8 59.2 | 2.08 |
| 30.5 | 16 5.1 | 58 55.3 | 2.16 | U. 20 2.1 | 2.40 | 16 28.5 | 60 21.2 | 0.91 | U. 21 24.1 | 2.08 |
| 31.0 | 16 12.1 | 59 21.0 | 2.10 | L. 8 30.7 | 2.35 | 16 31.0 | 60 30.7 | 0.65 | L. 9 49.1 | 2.09 |
| 31.5 | 16 18.8 | 59 45.7 | +1.99 | U. 20 58.7 | 2.31 | 16 32.7 | 60 36.8 | +0.35 | U. 22 14.2 | 2.11 |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

| | MAY. | | | | | JUNE. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 16 31.0 | 60 30.7 | +0.65 | L. 9 49.1 | 2.09 | 16 12.8 | 59 23.9 | —0.99 | L. 11 9.9 | 2.41 |
| 1.5 | 16 32.7 | 60 36.8 | 0.35 | U. 22 14.2 | 2.11 | 16 9.2 | 59 10.7 | 1.20 | U. 23 39.2 | 2.46 |
| 2.0 | 16 33.4 | 60 39.2 | +0.04 | L. 10 39.7 | 2.15 | 16 5.0 | 58 55.1 | 1.39 | | |
| 2.5 | 16 33.0 | 60 37.8 | —0.28 | U. 23 5.7 | 2.20 | 16 0.2 | 58 37.3 | 1.55 | L. 12 9.0 | 2.50 |
| 3.0 | 16 31.5 | 60 32.4 | 0.61 | L. 11 32.4 | 2.25 | 15 54.9 | 58 17.8 | 1.68 | U. 0 39.2 | 2.52 |
| 3.5 | 16 28.9 | 60 23.0 | 0.93 | U. 23 59.8 | 2.31 | 15 49.2 | 57 56.9 | 1.78 | L. 13 9.4 | 2.50 |
| 4.0 | 16 25.4 | 60 9.9 | 1.23 | | | 15 43.2 | 57 35.0 | 1.85 | U. 1 39.2 | 2.46 |
| 4.5 | 16 21.0 | 59 53.4 | 1.50 | L. 12 27.9 | 2.37 | 15 37.1 | 57 12.6 | 1.87 | L. 14 8.5 | 2.40 |
| 5.0 | 16 15.7 | 59 33.9 | 1.73 | U. 0 56.7 | 2.42 | 15 31.0 | 56 50.2 | 1.85 | U. 2 36.9 | 2.33 |
| 5.5 | 16 9.6 | 59 11.8 | 1.92 | L. 13 26.1 | 2.47 | 15 25.0 | 56 28.1 | 1.81 | L. 15 4.3 | 2.24 |
| 6.0 | 16 3.0 | 58 47.7 | 2.07 | U. 1 56.0 | 2.50 | 15 19.2 | 56 6.8 | 1.73 | U. 3 30.6 | 2.14 |
| 6.5 | 15 56.1 | 58 22.2 | 2.16 | L. 14 26.1 | 2.50 | 15 13.7 | 55 46.5 | 1.63 | L. 15 55.7 | 2.05 |
| 7.0 | 15 48.9 | 57 55.9 | 2.20 | U. 2 56.1 | 2.48 | 15 8.6 | 55 27.7 | 1.50 | U. 4 19.7 | 1.95 |
| 7.5 | 15 41.7 | 57 29.4 | 2.19 | L. 15 25.7 | 2.44 | 15 3.9 | 55 10.6 | 1.34 | L. 16 42.6 | 1.87 |
| 8.0 | 15 34.6 | 57 3.3 | 2.15 | U. 3 54.6 | 2.38 | 14 59.8 | 54 55.5 | 1.17 | U. 5 4.6 | 1.80 |
| 8.5 | 15 27.7 | 56 37.9 | 2.07 | L. 16 22.7 | 2.30 | 14 56.2 | 54 42.5 | 0.99 | L. 17 25.8 | 1.74 |
| 9.0 | 15 21.1 | 56 13.6 | 1.96 | U. 4 49.7 | 2.20 | 14 53.3 | 54 31.8 | 0.79 | U. 5 46.3 | 1.69 |
| 9.5 | 15 14.9 | 55 50.9 | 1.81 | L. 17 15.6 | 2.11 | 14 51.1 | 54 23.6 | 0.58 | L. 18 6.3 | 1.65 |
| 10.0 | 15 9.2 | 55 30.1 | 1.65 | U. 5 40.4 | 2.02 | 14 49.6 | 54 18.0 | 0.36 | U. 6 26.0 | 1.63 |
| 10.5 | 15 4.1 | 55 11.4 | 1.46 | L. 18 4.2 | 1.94 | 14 48.7 | 54 15.0 | —0.14 | L. 18 45.5 | 1.62 |
| 11.0 | 14 59.6 | 54 55.0 | 1.27 | U. 6 26.9 | 1.86 | 14 48.6 | 54 14.5 | +0.07 | U. 7 4.9 | 1.62 |
| 11.5 | 14 55.8 | 54 41.0 | 1.06 | L. 18 48.7 | 1.79 | 14 49.2 | 54 16.6 | 0.27 | L. 19 24.4 | 1.64 |
| 12.0 | 14 52.7 | 54 29.5 | 0.85 | U. 7 9.8 | 1.73 | 14 50.4 | 54 21.1 | 0.47 | U. 7 44.2 | 1.67 |
| 12.5 | 14 50.2 | 54 20.5 | 0.65 | L. 19 30.3 | 1.69 | 14 52.3 | 54 28.0 | 0.67 | L. 20 4.4 | 1.70 |
| 13.0 | 14 48.4 | 54 14.0 | 0.44 | U. 7 50.3 | 1.65 | 14 54.8 | 54 37.2 | 0.85 | U. 8 25.1 | 1.75 |
| 13.5 | 14 47.3 | 54 9.9 | 0.24 | L. 20 9.9 | 1.63 | 14 57.8 | 54 48.4 | 1.00 | L. 20 46.5 | 1.82 |
| 14.0 | 14 46.9 | 54 8.3 | —0.04 | U. 8 29.4 | 1.62 | 15 1.3 | 55 1.3 | 1.14 | U. 9 8.8 | 1.90 |
| 14.5 | 14 47.1 | 54 9.0 | +0.15 | L. 20 48.8 | 1.62 | 15 5.3 | 55 15.8 | 1.27 | L. 21 32.0 | 1.98 |
| 15.0 | 14 47.9 | 54 11.9 | 0.32 | U. 9 8.3 | 1.64 | 15 9.6 | 55 31.7 | 1.37 | U. 9 56.2 | 2.07 |
| 15.5 | 14 49.2 | 54 16.8 | 0.48 | L. 21 28.1 | 1.66 | 15 14.2 | 55 48.6 | 1.44 | L. 22 21.6 | 2.16 |
| 16.0 | 14 51.0 | 54 23.5 | 0.62 | U. 9 48.2 | 1.70 | 15 19.0 | 56 6.3 | 1.49 | U. 10 48.1 | 2.25 |
| 16.5 | 14 53.3 | 54 31.8 | 0.75 | L. 22 8.9 | 1.75 | 15 24.0 | 56 24.4 | 1.52 | L. 23 15.6 | 2.33 |
| 17.0 | 14 56.0 | 54 41.6 | 0.87 | U. 10 30.2 | 1.81 | 15 29.0 | 56 42.8 | 1.53 | U. 11 44.1 | 2.40 |
| 17.5 | 14 59.0 | 54 52.7 | 0.97 | L. 22 52.3 | 1.88 | 15 34.0 | 57 1.1 | 1.51 | | |
| 18.0 | 15 2.4 | 55 5.0 | 1.07 | U. 11 15.2 | 1.95 | 15 38.9 | 57 19.0 | 1.46 | L. 0 13.3 | 2.45 |
| 18.5 | 15 6.0 | 55 18.3 | 1.14 | L. 23 39.2 | 2.04 | 15 43.6 | 57 36.2 | 1.40 | U. 12 43.0 | 2.48 |
| 19.0 | 15 9.8 | 55 32.3 | 1.19 | | | 15 48.0 | 57 52.5 | 1.31 | L. 1 12.8 | 2.48 |
| 19.5 | 15 13.7 | 55 46.8 | 1.23 | U. 12 4.2 | 2.13 | 15 52.1 | 58 7.7 | 1.21 | U. 13 42.5 | 2.46 |
| 20.0 | 15 17.8 | 56 1.8 | 1.26 | L. 0 30.2 | 2.21 | 15 55.9 | 58 21.6 | 1.10 | L. 2 11.8 | 2.41 |
| 20.5 | 15 22.0 | 56 17.1 | 1.28 | U. 12 57.2 | 2.29 | 15 59.3 | 58 34.2 | 0.99 | U. 14 40.4 | 2.35 |
| 21.0 | 15 26.2 | 56 32.5 | 1.29 | L. 1 25.1 | 2.35 | 16 2.3 | 58 45.3 | 0.86 | L. 3 8.2 | 2.28 |
| 21.5 | 15 30.4 | 56 48.0 | 1.29 | U. 13 53.6 | 2.40 | 16 4.9 | 58 54.8 | 0.73 | U. 15 35.2 | 2.22 |
| 22.0 | 15 34.6 | 57 3.4 | 1.28 | L. 2 22.6 | 2.42 | 16 7.1 | 59 2.8 | 0.60 | L. 4 1.4 | 2.15 |
| 22.5 | 15 38.7 | 57 18.6 | 1.26 | U. 14 51.8 | 2.43 | 16 8.9 | 59 9.3 | 0.48 | U. 16 26.9 | 2.10 |
| 23.0 | 15 42.8 | 57 33.6 | 1.24 | L. 3 21.0 | 2.42 | 16 10.2 | 59 14.3 | 0.36 | L. 4 51.7 | 2.06 |
| 23.5 | 15 46.8 | 57 48.3 | 1.21 | U. 15 49.8 | 2.38 | 16 11.2 | 59 17.9 | 0.25 | U. 17 16.0 | 2.02 |
| 24.0 | 15 50.8 | 58 2.7 | 1.18 | L. 4 18.1 | 2.33 | 16 11.8 | 59 20.2 | 0.14 | L. 5 40.0 | 1.99 |
| 24.5 | 15 54.6 | 58 16.7 | 1.15 | U. 16 45.8 | 2.28 | 16 12.1 | 59 21.3 | +0.04 | U. 18 3.8 | 1.98 |
| 25.0 | 15 58.2 | 58 30.2 | 1.11 | L. 5 12.7 | 2.21 | 16 12.1 | 59 21.1 | —0.07 | L. 6 27.6 | 1.99 |
| 25.5 | 16 1.7 | 58 43.2 | 1.06 | U. 17 38.9 | 2.15 | 16 11.7 | 59 19.6 | 0.18 | U. 18 51.6 | 2.02 |
| 26.0 | 16 5.1 | 58 55.6 | 1.00 | L. 6 4.4 | 2.10 | 16 10.9 | 59 16.8 | 0.29 | L. 7 16.0 | 2.05 |
| 26.5 | 16 8.3 | 59 7.3 | 0.93 | U. 18 29.4 | 2.06 | 16 9.8 | 59 12.7 | 0.40 | U. 19 40.9 | 2.10 |
| 27.0 | 16 11.3 | 59 18.0 | 0.85 | L. 6 53.9 | 2.03 | 16 8.3 | 59 7.3 | 0.51 | L. 8 6.5 | 2.16 |
| 27.5 | 16 13.9 | 59 27.6 | 0.74 | U. 19 18.1 | 2.01 | 16 6.5 | 59 0.5 | 0.63 | U. 20 32.8 | 2.23 |
| 28.0 | 16 16.1 | 59 35.8 | 0.62 | L. 7 42.2 | 2.01 | 16 4.2 | 58 52.2 | 0.76 | L. 9 0.0 | 2.30 |
| 28.5 | 16 17.9 | 59 42.4 | 0.48 | U. 20 6.4 | 2.03 | 16 1.5 | 58 42.3 | 0.89 | U. 21 28.0 | 2.36 |
| 29.0 | 16 19.2 | 59 47.2 | 0.31 | L. 8 30.8 | 2.05 | 15 58.4 | 58 30.9 | 1.01 | L. 9 56.7 | 2.42 |
| 29.5 | 16 19.9 | 59 49.9 | +0.12 | U. 20 55.6 | 2.09 | 15 54.9 | 58 18.1 | 1.12 | U. 22 26.0 | 2.46 |
| 30.0 | 16 20.0 | 59 50.1 | —0.09 | L. 9 20.9 | 2.14 | 15 51.1 | 58 3.9 | 1.23 | L. 10 55.7 | 2.48 |
| 30.5 | 16 19.3 | 59 47.7 | 0.32 | U. 21 47.0 | 2.20 | 15 46.9 | 57 48.6 | 1.32 | U. 23 25.6 | 2.48 |
| 31.0 | 16 17.9 | 59 42.5 | 0.55 | L. 10 13.8 | 2.27 | 15 42.4 | 57 32.3 | 1.39 | L. 11 55.2 | 2.45 |
| 31.5 | 16 15.7 | 59 34.5 | —0.77 | U. 22 41.4 | 2.34 | 15 37.7 | 57 15.3 | —1.44 | | |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

| | JULY. | | | | | AUGUST. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 15 42.5 | 57 32.3 | —1.40 | L. 11 55.2 | 2.45 | 15 5.0 | 55 14.9 | —1.13 | U. 0 51.8 | 1.92 |
| 1.5 | 15 37.8 | 57 15.0 | 1.46 | | | 15 1.5 | 55 1.8 | 1.05 | L. 13 14.5 | 1.86 |
| 2.0 | 15 32.9 | 56 57.2 | 1.50 | U. 0 24.1 | 2.39 | 14 58.2 | 54 49.8 | 0.95 | U. 1 36.4 | 1.79 |
| 2.5 | 15 27.9 | 56 39.0 | 1.52 | L. 12 52.3 | 2.32 | 14 55.2 | 54 38.9 | 0.85 | L. 13 57.5 | 1.73 |
| 3.0 | 15 23.0 | 56 20.7 | 1.51 | U. 1 19.6 | 2.23 | 14 52.6 | 54 29.3 | 0.74 | U. 2 18.0 | 1.68 |
| 3.5 | 15 18.1 | 56 2.7 | 1.48 | L. 13 45.8 | 2.14 | 14 50.4 | 54 21.2 | 0.61 | L. 14 38.0 | 1.64 |
| 4.0 | 15 13.3 | 55 45.2 | 1.43 | U. 2 10.9 | 2.05 | 14 48.7 | 54 14.8 | 0.46 | U. 2 57.6 | 1.62 |
| 4.5 | 15 8.8 | 55 28.5 | 1.35 | L. 14 34.9 | 1.96 | 14 47.5 | 54 10.3 | 0.29 | L. 15 17.1 | 1.61 |
| 5.0 | 15 4.5 | 55 12.9 | 1.24 | U. 2 57.9 | 1.87 | 14 46.8 | 54 7.8 | —0.11 | U. 3 36.5 | 1.61 |
| 5.5 | 15 0.6 | 54 58.7 | 1.12 | L. 15 19.9 | 1.79 | 14 46.7 | 54 7.5 | +0.07 | L. 15 56.0 | 1.62 |
| 6.0 | 14 57.2 | 54 46.1 | 0.98 | U. 3 41.1 | 1.74 | 14 47.2 | 54 9.5 | 0.27 | U. 4 15.7 | 1.65 |
| 6.5 | 14 54.3 | 54 35.3 | 0.82 | L. 16 1.7 | 1.69 | 14 48.4 | 54 13.9 | 0.48 | L. 16 35.8 | 1.69 |
| 7.0 | 14 51.9 | 54 26.5 | 0.64 | U. 4 21.8 | 1.65 | 14 50.3 | 54 20.9 | 0.69 | U. 4 56.4 | 1.73 |
| 7.5 | 14 50.1 | 54 20.0 | 0.44 | L. 16 41.5 | 1.63 | 14 52.9 | 54 30.4 | 0.90 | L. 17 17.6 | 1.79 |
| 8.0 | 14 49.0 | 54 15.9 | 0.24 | U. 5 1.0 | 1.62 | 14 56.2 | 54 42.5 | 1.11 | U. 5 39.6 | 1.87 |
| 8.5 | 14 48.5 | 54 14.2 | —0.04 | L. 17 20.4 | 1.62 | 15 0.2 | 54 57.0 | 1.31 | L. 18 2.6 | 1.96 |
| 9.0 | 14 48.7 | 54 15.0 | +0.17 | U. 5 39.9 | 1.63 | 15 4.8 | 55 13.9 | 1.50 | U. 6 26.6 | 2.05 |
| 9.5 | 14 49.7 | 54 18.4 | 0.39 | L. 17 59.6 | 1.65 | 15 10.0 | 55 33.0 | 1.68 | L. 18 51.7 | 2.14 |
| 10.0 | 14 51.3 | 54 24.4 | 0.61 | U. 6 19.7 | 1.69 | 15 15.8 | 55 54.2 | 1.84 | U. 7 17.9 | 2.23 |
| 10.5 | 14 53.6 | 54 33.0 | 0.82 | L. 18 40.4 | 1.75 | 15 22.0 | 56 17.2 | 1.98 | L. 19 45.2 | 2.32 |
| 11.0 | 14 56.6 | 54 44.0 | 1.02 | U. 7 1.8 | 1.81 | 15 28.7 | 56 41.7 | 2.09 | U. 8 13.5 | 2.40 |
| 11.5 | 15 0.2 | 54 57.4 | 1.21 | L. 19 24.0 | 1.89 | 15 35.7 | 57 7.4 | 2.18 | L. 20 42.6 | 2.46 |
| 12.0 | 15 4.5 | 55 13.0 | 1.38 | U. 7 47.2 | 1.97 | 15 42.9 | 57 33.9 | 2.22 | U. 9 12.3 | 2.50 |
| 12.5 | 15 9.3 | 55 30.5 | 1.53 | L. 20 11.4 | 2.06 | 15 50.2 | 58 0.6 | 2.21 | L. 21 42.4 | 2.52 |
| 13.0 | 15 14.5 | 55 49.7 | 1.66 | U. 8 36.8 | 2.16 | 15 57.4 | 58 26.9 | 2.16 | U. 10 12.5 | 2.51 |
| 13.5 | 15 20.1 | 56 10.3 | 1.76 | L. 21 3.3 | 2.26 | 16 4.3 | 58 52.4 | 2.06 | L. 22 42.3 | 2.47 |
| 14.0 | 15 26.0 | 56 31.9 | 1.83 | U. 9 30.9 | 2.35 | 16 10.8 | 59 16.4 | 1.91 | U. 11 11.6 | 2.42 |
| 14.5 | 15 32.1 | 56 54.2 | 1.87 | L. 21 59.5 | 2.43 | 16 16.8 | 59 38.3 | 1.72 | L. 23 40.3 | 2.36 |
| 15.0 | 15 38.2 | 57 16.8 | 1.88 | U. 10 29.0 | 2.49 | 16 22.0 | 59 57.6 | 1.48 | U. 12 8.3 | 2.39 |
| 15.5 | 15 44.3 | 57 39.3 | 1.85 | L. 22 59.0 | 2.52 | 16 26.4 | 60 13.8 | 1.20 | | |
| 16.0 | 15 50.3 | 58 1.2 | 1.78 | U. 11 29.2 | 2.53 | 16 29.9 | 60 26.5 | 0.90 | L. 0 35.5 | 2.23 |
| 16.5 | 15 56.0 | 58 22.1 | 1.68 | L. 23 59.4 | 2.51 | 16 32.3 | 60 35.4 | 0.58 | U. 13 2.0 | 2.18 |
| 17.0 | 16 1.3 | 58 41.6 | 1.55 | U. 12 29.2 | 2.46 | 16 33.7 | 60 40.4 | +0.25 | L. 1 27.9 | 2.13 |
| 17.5 | 16 6.1 | 58 59.3 | 1.38 | | | 16 34.0 | 60 41.4 | —0.08 | U. 13 53.3 | 2.10 |
| 18.0 | 16 10.3 | 59 14.7 | 1.18 | L. 0 58.3 | 2.40 | 16 33.2 | 60 38.5 | 0.40 | L. 2 18.4 | 2.08 |
| 18.5 | 16 13.9 | 59 27.7 | 0.97 | U. 13 26.7 | 2.33 | 16 31.4 | 60 31.8 | 0.70 | U. 14 43.3 | 2.08 |
| 19.0 | 16 16.7 | 59 38.0 | 0.74 | L. 1 54.2 | 2.26 | 16 28.6 | 60 21.8 | 0.96 | L. 3 8.3 | 2.09 |
| 19.5 | 16 18.7 | 59 45.5 | 0.51 | U. 14 20.9 | 2.19 | 16 25.1 | 60 8.9 | 1.17 | U. 15 33.4 | 2.11 |
| 20.0 | 16 20.0 | 59 50.3 | 0.29 | L. 2 46.8 | 2.12 | 16 21.0 | 59 53.7 | 1.35 | L. 3 58.9 | 2.14 |
| 20.5 | 16 20.6 | 59 52.4 | +0.06 | U. 15 12.0 | 2.07 | 16 16.3 | 59 36.5 | 1.50 | U. 16 24.8 | 2.18 |
| 21.0 | 16 20.5 | 59 51.8 | —0.15 | L. 3 36.7 | 2.04 | 16 11.2 | 59 17.8 | 1.60 | L. 4 51.2 | 2.23 |
| 21.5 | 16 19.6 | 59 48.8 | 0.34 | U. 16 1.1 | 2.02 | 16 5.9 | 58 58.2 | 1.66 | U. 17 18.3 | 2.28 |
| 22.0 | 16 18.2 | 59 43.6 | 0.51 | L. 4 25.3 | 2.00 | 16 0.4 | 58 38.0 | 1.69 | L. 5 46.0 | 2.33 |
| 22.5 | 16 16.3 | 59 36.6 | 0.65 | U. 16 49.4 | 2.01 | 15 54.8 | 58 17.5 | 1.70 | U. 18 14.3 | 2.37 |
| 23.0 | 16 13.9 | 59 27.9 | 0.78 | L. 5 13.7 | 2.03 | 15 49.3 | 57 57.2 | 1.68 | L. 6 43.0 | 2.40 |
| 23.5 | 16 11.2 | 59 17.8 | 0.88 | U. 17 38.3 | 2.07 | 15 43.8 | 57 37.2 | 1.64 | U. 19 11.9 | 2.41 |
| 24.0 | 16 8.2 | 59 6.7 | 0.96 | L. 6 3.4 | 2.11 | 15 38.5 | 57 17.8 | 1.59 | L. 7 40.9 | 2.41 |
| 24.5 | 16 4.9 | 58 54.7 | 1.03 | U. 18 29.1 | 2.17 | 15 33.3 | 56 58.9 | 1.54 | U. 20 9.8 | 2.39 |
| 25.0 | 16 1.4 | 58 42.0 | 1.09 | L. 6 55.5 | 2.23 | 15 28.4 | 56 40.7 | 1.48 | L. 8 38.2 | 2.34 |
| 25.5 | 15 57.8 | 58 28.6 | 1.14 | U. 19 22.6 | 2.29 | 15 23.7 | 56 23.4 | 1.41 | U. 21 5.9 | 2.27 |
| 26.0 | 15 54.0 | 58 14.7 | 1.18 | L. 7 50.4 | 2.35 | 15 19.2 | 56 6.8 | 1.35 | L. 9 32.8 | 2.20 |
| 26.5 | 15 50.1 | 58 0.4 | 1.21 | U. 20 18.8 | 2.40 | 15 14.9 | 55 51.0 | 1.28 | U. 21 58.8 | 2.13 |
| 27.0 | 15 46.1 | 57 45.8 | 1.23 | L. 8 47.7 | 2.43 | 15 10.8 | 55 36.1 | 1.20 | L. 10 23.9 | 2.05 |
| 27.5 | 15 42.1 | 57 30.9 | 1.25 | U. 21 16.9 | 2.44 | 15 7.0 | 55 22.1 | 1.13 | U. 22 48.0 | 1.97 |
| 28.0 | 15 37.9 | 57 15.7 | 1.28 | L. 9 46.1 | 2.43 | 15 3.4 | 55 9.0 | 1.05 | L. 11 11.1 | 1.89 |
| 28.5 | 15 33.7 | 57 0.2 | 1.30 | U. 22 15.0 | 2.40 | 15 0.1 | 54 56.8 | 0.98 | U. 23 33.3 | 1.82 |
| 29.0 | 15 29.5 | 56 44.6 | 1.30 | L. 10 43.4 | 2.34 | 14 57.1 | 54 45.5 | 0.90 | L. 11 54.8 | 1.76 |
| 29.5 | 15 25.2 | 56 29.0 | 1.29 | U. 23 11.0 | 2.27 | 14 54.3 | 54 35.3 | 0.81 | | |
| 30.0 | 15 21.0 | 56 13.6 | 1.27 | L. 11 37.7 | 2.19 | 14 51.8 | 54 26.1 | 0.71 | U. 0 15.6 | 1.71 |
| 30.5 | 15 16.9 | 55 58.4 | 1.25 | | | 14 49.6 | 54 18.1 | 0.61 | L. 12 35.9 | 1.67 |
| 31.0 | 15 12.8 | 55 43.4 | 1.23 | U. 0 3.4 | 2.10 | 14 47.8 | 54 11.4 | 0.50 | U. 0 55.7 | 1.64 |
| 31.5 | 15 8.8 | 55 28.8 | —1.19 | L 12 28.1 | 2.01 | 14 46.3 | 54 6.0 | —0.39 | L. 13 15.3 | 1.63 |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

| | SEPTEMBER. | | | | | OCTOBER. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 14 45.4 | 54 2.9 | —0.31 | U. 1 34.7 | 1.61 | 14 45.4 | 54 2.8 | +0.37 | U. 1 33.5 | 1.76 |
| 1.5 | 14 44.7 | 54 0.1 | 0.16 | L. 13 54.1 | 1.62 | 14 46.9 | 54 8.2 | 0.53 | L. 13 55.0 | 1.82 |
| 2.0 | 14 44.4 | 53 59.1 | —0.01 | U. 2 13.6 | 1.62 | 14 48.9 | 54 15.5 | 0.68 | U. 2 17.2 | 1.88 |
| 2.5 | 14 44.6 | 53 59.9 | +0.14 | L. 14 33.3 | 1.65 | 14 51.4 | 54 24.6 | 0.83 | L. 14 40.2 | 1.95 |
| 3.0 | 14 45.4 | 54 2.6 | 0.30 | U. 2 53.4 | 1.69 | 14 54.4 | 54 35.5 | 0.99 | U. 3 4.1 | 2.03 |
| 3.5 | 14 46.7 | 54 7.3 | 0.47 | L. 15 14.0 | 1.74 | 14 57.9 | 54 48.4 | 1.15 | L. 15 28.9 | 2.11 |
| 4.0 | 14 48.6 | 54 14.2 | 0.65 | U. 3 35.3 | 1.80 | 15 1.9 | 55 3.2 | 1.32 | U. 3 54.6 | 2.18 |
| 4.5 | 14 51.1 | 54 23.3 | 0.85 | L. 15 57.3 | 1.87 | 15 6.5 | 55 20.0 | 1.48 | L. 16 21.1 | 2.24 |
| 5.0 | 14 54.3 | 54 34.7 | 1.05 | U. 4 20.1 | 1.94 | 15 11.6 | 55 38.7 | 1.65 | U. 4 48.3 | 2.31 |
| 5.5 | 14 58.0 | 54 48.5 | 1.25 | L. 16 43.9 | 2.02 | 15 17.2 | 55 59.4 | 1.81 | L. 17 16.2 | 2.35 |
| 6.0 | 15 2.3 | 55 4.6 | 1.44 | U. 5 8.7 | 2.11 | 15 23.4 | 56 22.0 | 1.97 | U. 5 44.4 | 2.36 |
| 6.5 | 15 7.3 | 55 23.0 | 1.68 | L. 17 34.5 | 2.20 | 15 30.0 | 56 46.4 | 2.11 | L. 18 12.7 | 2.36 |
| 7.0 | 15 12.9 | 55 43.6 | 1.82 | U. 6 1.3 | 2.28 | 15 37.0 | 57 12.3 | 2.22 | U. 6 41.0 | 2.36 |
| 7.5 | 15 19.1 | 56 6.4 | 2.00 | L. 18 29.0 | 2.34 | 15 44.4 | 57 39.4 | 2.30 | L. 19 9.2 | 2.34 |
| 8.0 | 15 25.8 | 56 31.2 | 2.16 | U. 6 57.4 | 2.40 | 15 52.1 | 58 7.4 | 2.37 | U. 7 37.0 | 2.31 |
| 8.5 | 15 33.0 | 56 57.7 | 2.28 | L. 19 26.4 | 2.44 | 15 59.8 | 58 35.9 | 2.41 | L. 20 4.3 | 2.27 |
| 9.0 | 15 40.6 | 57 25.4 | 2.35 | U. 7 55.7 | 2.46 | 16 7.5 | 59 4.4 | 2.36 | U. 8 31.2 | 2.22 |
| 9.5 | 15 48.4 | 57 53.9 | 2.42 | L. 20 25.1 | 2.45 | 16 15.1 | 59 32.0 | 2.25 | L. 20 57.5 | 2.17 |
| 10.0 | 15 56.3 | 58 22.9 | 2.45 | U. 8 54.3 | 2.42 | 16 22.3 | 59 58.1 | 2.13 | U. 9 23.4 | 2.14 |
| 10.5 | 16 4.1 | 58 51.9 | 2.38 | L. 21 23.1 | 2.38 | 16 28.9 | 60 22.3 | 1.90 | L. 21 49.1 | 2.13 |
| 11.0 | 16 11.7 | 59 20.1 | 2.32 | U. 9 51.4 | 2.34 | 16 34.7 | 60 43.7 | 1.63 | U. 10 14.7 | 2.13 |
| 11.5 | 16 19.0 | 59 46.6 | 2.12 | L. 22 19.2 | 2.29 | 16 39.4 | 61 1.4 | 1.35 | L. 22 40.3 | 2.13 |
| 12.0 | 16 25.6 | 60 10.7 | 1.91 | U. 10 46.4 | 2.24 | 16 43.1 | 61 15.3 | 0.98 | U. 11 6.0 | 2.14 |
| 12.5 | 16 31.4 | 60 32.0 | 1.69 | L. 23 13.0 | 2.20 | 16 45.5 | 61 24.5 | 0.57 | L. 23 31.9 | 2.18 |
| 13.0 | 16 36.3 | 60 50.1 | 1.33 | U. 11 39.1 | 2.17 | 16 46.7 | 61 28.7 | +0.15 | U. 11 58.4 | 2.23 |
| 13.5 | 16 40.0 | 61 3.9 | 0.98 | | | 16 46.5 | 61 27.9 | —0.30 | | |
| 14.0 | 16 42.5 | 61 13.3 | 0.59 | L. 0 5.0 | 2.15 | 16 44.9 | 61 21.9 | 0.71 | L. 0 25.5 | 2.28 |
| 14.5 | 16 43.8 | 61 18.0 | +0.18 | U. 12 30.7 | 2.14 | 16 42.0 | 61 11.1 | 1.11 | U. 12 53.2 | 2.34 |
| 15.0 | 16 43.8 | 61 17.8 | —0.22 | L. 0 56.4 | 2.13 | 16 37.8 | 60 55.8 | 1.44 | L. 1 21.7 | 2.40 |
| 15.5 | 16 42.4 | 61 12.9 | 0.62 | U. 13 22.1 | 2.15 | 16 32.6 | 60 36.6 | 1.80 | U. 13 50.9 | 2.46 |
| 16.0 | 16 39.8 | 61 3.3 | 0.98 | L. 1 48.1 | 2.18 | 16 26.4 | 60 13.6 | 2.06 | L. 2 20.8 | 2.52 |
| 16.5 | 16 36.1 | 60 49.6 | 1.35 | U. 14 14.6 | 2.22 | 16 19.4 | 59 47.9 | 2.26 | U. 14 51.2 | 2.56 |
| 17.0 | 16 31.4 | 60 32.0 | 1.60 | L. 2 41.7 | 2.27 | 16 11.9 | 59 20.3 | 2.37 | L. 3 22.0 | 2.58 |
| 17.5 | 16 25.9 | 60 11.6 | 1.82 | U. 15 9.3 | 2.32 | 16 4.1 | 58 51.7 | 2.42 | U. 15 52.8 | 2.57 |
| 18.0 | 16 19.7 | 59 48.9 | 1.97 | L. 3 37.6 | 2.37 | 15 56.2 | 58 22.7 | 2.43 | L. 4 23.3 | 2.53 |
| 18.5 | 16 13.0 | 59 24.6 | 2.11 | U. 16 6.4 | 2.42 | 15 48.3 | 57 53.8 | 2.40 | U. 16 53.2 | 2.47 |
| 19.0 | 16 6.0 | 58 58.9 | 2.20 | L. 4 35.6 | 2.46 | 15 40.6 | 57 25.4 | 2.32 | L. 5 22.1 | 2.38 |
| 19.5 | 15 58.8 | 58 32.5 | 2.22 | U. 17 5.2 | 2.48 | 15 33.2 | 56 57.9 | 2.22 | U. 17 50.0 | 2.28 |
| 20.0 | 15 51.6 | 58 6.1 | 2.17 | L. 5 34.8 | 2.48 | 15 26.2 | 56 32.1 | 2.09 | L. 6 16.7 | 2.18 |
| 20.5 | 15 44.5 | 57 40.4 | 2.12 | U. 18 4.3 | 2.45 | 15 19.6 | 56 8.0 | 1.94 | U. 18 42.3 | 2.06 |
| 21.0 | 15 37.8 | 57 15.5 | 2.04 | L. 6 33.3 | 2.40 | 15 13.5 | 55 45.8 | 1.76 | L. 7 6.7 | 1.98 |
| 21.5 | 15 31.4 | 56 51.7 | 1.94 | U. 19 1.6 | 2.34 | 15 8.0 | 55 25.7 | 1.58 | U. 19 30.0 | 1.89 |
| 22.0 | 15 25.4 | 56 29.2 | 1.81 | L. 7 29.2 | 2.26 | 15 3.2 | 55 7.7 | 1.40 | L. 7 52.3 | 1.82 |
| 22.5 | 15 19.8 | 56 8.3 | 1.67 | U. 19 55.8 | 2.17 | 14 58.9 | 54 52.0 | 1.22 | U. 20 13.8 | 1.76 |
| 23.0 | 15 14.4 | 55 49.1 | 1.53 | L. 8 21.3 | 2.08 | 14 55.2 | 54 38.4 | 1.04 | L. 8 34.6 | 1.70 |
| 23.5 | 15 9.5 | 55 31.5 | 1.40 | U. 20 45.8 | 2.00 | 14 52.0 | 54 26.9 | 0.87 | U. 20 54.8 | 1.66 |
| 24.0 | 15 5.1 | 55 15.4 | 1.27 | L. 9 9.3 | 1.92 | 14 49.4 | 54 17.4 | 0.70 | L. 9 14.6 | 1.63 |
| 24.5 | 15 1.2 | 55 0.9 | 1.14 | U. 21 31.9 | 1.85 | 14 47.3 | 54 9.9 | 0.54 | U. 21 34.1 | 1.61 |
| 25.0 | 14 57.7 | 54 47.9 | 1.01 | L. 9 53.7 | 1.79 | 14 45.8 | 54 4.2 | 0.38 | L. 9 53.4 | 1.60 |
| 25.5 | 14 54.6 | 54 36.5 | 0.88 | U. 22 14.8 | 1.78 | 14 44.8 | 54 0.4 | 0.25 | U. 22 12.7 | 1.60 |
| 26.0 | 14 51.9 | 54 26.6 | 0.76 | L. 10 35.2 | 1.68 | 14 44.3 | 53 58.1 | —0.12 | L. 10 32.1 | 1.61 |
| 26.5 | 14 49.6 | 54 18.1 | 0.65 | U. 22 55.1 | 1.64 | 14 44.1 | 53 57.4 | +0.00 | U. 22 51.8 | 1.64 |
| 27.0 | 14 47.7 | 54 11.0 | 0.54 | L. 11 14.7 | 1.63 | 14 44.3 | 53 58.1 | 0.12 | L. 11 11.8 | 1.69 |
| 27.5 | 14 46.1 | 54 5.2 | 0.43 | U. 23 34.2 | 1.62 | 14 44.8 | 54 0.2 | 0.24 | U. 23 32.4 | 1.74 |
| 28.0 | 14 44.9 | 54 0.7 | 0.33 | L. 11 53.6 | 1.61 | 14 45.7 | 54 3.7 | 0.34 | L. 11 53.6 | 1.79 |
| 28.5 | 14 44.0 | 53 57.5 | 0.21 | | | 14 47.0 | 54 8.4 | 0.44 | | |
| 29.0 | 14 43.5 | 53 55.7 | —0.09 | U. 0 13.0 | 1.61 | 14 48.6 | 54 14.4 | 0.54 | U. 0 15.4 | 1.85 |
| 29.5 | 14 43.3 | 53 55.3 | +0.03 | L. 12 32.5 | 1.64 | 14 50.6 | 54 21.5 | 0.64 | L. 12 38.0 | 1.92 |
| 30.0 | 14 43.6 | 53 56.4 | 0.15 | U. 0 52.4 | 1.67 | 14 52.8 | 54 30.0 | 0.74 | U. 1 1.5 | 2.00 |
| 30.5 | 14 44.3 | 53 58.9 | 0.26 | L. 13 12.7 | 1.71 | 14 55.4 | 54 39.7 | 0.85 | L. 13 25.9 | 2.07 |
| 31.0 | 14 45.4 | 54 2.8 | 0.37 | U. 1 33.5 | 1.76 | 14 58.4 | 54 50.5 | 0.96 | U. 1 51.1 | 2.14 |
| 31.5 | 14 46.9 | 54 8.2 | +0.53 | L. 13 55.0 | 1.82 | 15 1.8 | 55 2.7 | +1.07 | L. 14 17.1 | 2.19 |

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

| Date. | NOVEMBER. | | | | | DECEMBER. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. | Semi-diameter. | Horizontal Parallax. | Hourly Diff. | Meridian Transit. | Hourly Diff. |
| d. | ′ ″ | ′ ″ | ″ | h. m. | m. | ′ ″ | ′ ″ | ″ | h. m. | m. |
| 1.0 | 15 5.4 | 55 16.2 | +1.18 | U. 2 43.8 | 2.26 | 15 30.3 | 56 47.7 | +1.33 | U. 3 25.2 | 2.26 |
| 1.5 | 15 9.5 | 55 31.1 | 1.30 | L. 15 11.1 | 2.29 | 15 34.6 | 57 3.8 | 1.36 | L. 15 52.0 | 2.21 |
| 2.0 | 15 14.0 | 55 47.4 | 1.41 | U. 3 38.7 | 2.32 | 15 39.1 | 57 20.2 | 1.38 | U. 4 18.2 | 2.15 |
| 2.5 | 15 18.8 | 56 5.0 | 1.52 | L. 16 6.5 | 2.32 | 15 43.6 | 57 36.9 | 1.41 | L. 16 43.8 | 2.10 |
| 3.0 | 15 23.9 | 56 23.9 | 1.63 | U. 4 34.3 | 2.30 | 15 48.2 | 57 53.9 | 1.43 | U. 5 8.8 | 2.06 |
| 3.5 | 15 29.3 | 56 44.1 | 1.74 | L. 17 1.8 | 2.28 | 15 52.9 | 58 11.1 | 1.45 | L. 17 33.3 | 2.02 |
| 4.0 | 15 35.0 | 57 5.5 | 1.83 | U. 5 29.0 | 2.25 | 15 57.7 | 58 28.4 | 1.44 | U. 5 57.4 | 1.99 |
| 4.5 | 15 41.1 | 57 27.9 | 1.91 | L. 17 55.8 | 2.21 | 16 2.4 | 58 45.5 | 1.42 | L. 18 21.2 | 1.97 |
| 5.0 | 15 47.5 | 57 51.2 | 1.98 | U. 6 22.0 | 2.16 | 16 7.0 | 59 2.2 | 1.38 | U. 6 44.9 | 1.96 |
| 5.5 | 15 54.1 | 58 15.2 | 2.03 | L. 18 47.7 | 2.12 | 16 11.4 | 59 18.2 | 1.31 | L. 19 8.6 | 1.98 |
| 6.0 | 16 0.8 | 58 39.6 | 2.07 | U. 7 13.0 | 2.08 | 16 15.5 | 59 33.2 | 1.21 | U. 7 32.6 | 2.01 |
| 6.5 | 16 7.4 | 59 4.1 | 2.05 | L. 19 38.0 | 2.05 | 16 19.2 | 59 46.8 | 1.08 | L. 19 57.1 | 2.05 |
| 7.0 | 16 13.9 | 59 28.0 | 1.97 | U. 8 2.6 | 2.04 | 16 22.4 | 59 58.6 | 0.91 | U. 8 22.1 | 2.11 |
| 7.5 | 16 20.0 | 59 50.6 | 1.83 | L. 20 27.1 | 2.05 | 16 24.9 | 60 8.1 | 0.70 | L. 20 47.9 | 2.19 |
| 8.0 | 16 25.7 | 60 11.3 | 1.64 | U. 8 51.8 | 2.07 | 16 26.8 | 60 15.0 | 0.46 | U. 9 14.7 | 2.27 |
| 8.5 | 16 30.7 | 60 29.5 | 1.41 | L. 21 16.8 | 2.10 | 16 27.8 | 60 18.8 | +0.19 | L. 21 42.5 | 2.36 |
| 9.0 | 16 34.9 | 60 44.7 | 1.14 | U. 9 42.2 | 2.14 | 16 27.9 | 60 19.3 | —0.11 | U. 10 11.4 | 2.45 |
| 9.5 | 16 38.1 | 60 56.4 | 0.82 | L. 22 8.2 | 2.19 | 16 27.1 | 60 16.4 | 0.43 | L. 22 41.4 | 2.53 |
| 10.0 | 16 40.1 | 61 4.1 | 0.47 | U. 10 34.8 | 2.25 | 16 25.3 | 60 9.9 | 0.77 | U. 11 12.2 | 2.60 |
| 10.5 | 16 41.0 | 61 7.4 | +0.09 | L. 23 2.3 | 2.33 | 16 22.6 | 59 59.9 | 0.99 | L. 23 43.8 | 2.65 |
| 11.0 | 16 40.6 | 61 6.1 | —0.30 | U. 11 30.8 | 2.42 | 16 18.9 | 59 46.5 | 1.25 | | |
| 11.5 | 16 39.0 | 61 0.2 | 0.69 | | | 16 14.4 | 59 30.0 | 1.51 | U. 12 15.6 | 2.66 |
| 12.0 | 16 36.2 | 60 49.7 | 1.06 | L. 0 0.3 | 2.51 | 16 9.3 | 59 10.7 | 1.73 | L. 0 47.3 | 2.63 |
| 12.5 | 16 32.2 | 60 35.0 | 1.41 | U. 12 30.8 | 2.58 | 16 3.5 | 58 49.1 | 1.89 | U. 13 16.5 | 2.57 |
| 13.0 | 16 27.1 | 60 16.4 | 1.71 | L. 1 2.0 | 2.63 | 15 57.1 | 58 25.8 | 2.02 | L. 1 48.9 | 2.50 |
| 13.5 | 16 21.2 | 59 54.5 | 1.97 | U. 13 33.6 | 2.66 | 15 50.3 | 58 1.1 | 2.11 | U. 14 18.3 | 2.40 |
| 14.0 | 16 14.5 | 59 29.9 | 2.16 | L. 2 5.3 | 2.64 | 15 43.4 | 57 35.9 | 2.11 | L. 2 46.3 | 2.28 |
| 14.5 | 16 7.3 | 59 3.3 | 2.30 | U. 14 36.7 | 2.60 | 15 36.5 | 57 10.7 | 2.11 | U. 15 12.9 | 2.16 |
| 15.0 | 15 59.6 | 58 35.3 | 2.39 | L. 3 7.5 | 2.53 | 15 29.8 | 56 45.8 | 2.06 | L. 3 38.2 | 2.05 |
| 15.5 | 15 51.8 | 58 6.6 | 2.42 | U. 15 37.4 | 2.43 | 15 23.3 | 56 21.7 | 1.98 | U. 16 2.3 | 1.95 |
| 16.0 | 15 44.0 | 57 37.9 | 2.41 | L. 4 6.0 | 2.33 | 15 17.0 | 55 58.8 | 1.86 | L. 4 25.2 | 1.87 |
| 16.5 | 15 36.4 | 57 9.6 | 2.32 | U. 16 33.4 | 2.23 | 15 11.2 | 55 37.5 | 1.69 | U. 16 47.2 | 1.79 |
| 17.0 | 15 29.0 | 56 42.5 | 2.20 | L. 4 59.5 | 2.12 | 15 6.0 | 55 18.2 | 1.53 | L. 5 8.3 | 1.72 |
| 17.5 | 15 22.0 | 56 17.0 | 2.06 | U. 17 24.3 | 2.01 | 15 1.4 | 55 1.0 | 1.34 | U. 17 28.7 | 1.68 |
| 18.0 | 15 15.5 | 55 53.3 | 1.90 | L. 5 47.8 | 1.91 | 14 57.4 | 54 46.1 | 1.15 | L. 5 48.7 | 1.64 |
| 18.5 | 15 9.6 | 55 31.6 | 1.71 | U. 18 10.3 | 1.83 | 14 54.0 | 54 33.7 | 0.94 | U. 18 8.3 | 1.62 |
| 19.0 | 15 4.4 | 55 12.1 | 1.53 | L. 6 31.9 | 1.76 | 14 51.3 | 54 24.0 | 0.71 | L. 6 27.8 | 1.61 |
| 19.5 | 14 59.7 | 54 55.1 | 1.32 | U. 18 52.7 | 1.70 | 14 49.3 | 54 16.9 | 0.48 | U. 18 47.2 | 1.62 |
| 20.0 | 14 55.6 | 54 40.5 | 1.13 | L. 7 12.9 | 1.66 | 14 48.1 | 54 12.4 | 0.26 | L. 7 6.8 | 1.64 |
| 20.5 | 14 52.3 | 54 28.3 | 0.90 | U. 19 32.7 | 1.63 | 14 47.5 | 54 10.5 | —0.05 | U. 19 26.7 | 1.67 |
| 21.0 | 14 49.6 | 54 18.7 | 0.70 | L. 7 52.2 | 1.61 | 14 47.6 | 54 11.0 | +0.15 | L. 7 47.0 | 1.71 |
| 21.5 | 14 47.7 | 54 11.5 | 0.50 | U. 20 11.5 | 1.60 | 14 48.5 | 54 13.8 | 0.35 | U. 20 7.9 | 1.77 |
| 22.0 | 14 46.4 | 54 6.6 | 0.31 | L. 8 30.8 | 1.61 | 14 49.9 | 54 19.0 | 0.54 | L. 8 29.5 | 1.83 |
| 22.5 | 14 45.7 | 54 3.9 | —0.13 | U. 20 50.3 | 1.63 | 14 51.9 | 54 26.4 | 0.71 | U. 20 51.9 | 1.90 |
| 23.0 | 14 45.6 | 54 3.3 | +0.04 | L. 9 10.1 | 1.67 | 14 54.4 | 54 35.8 | 0.86 | L. 9 15.2 | 1.98 |
| 23.5 | 14 46.0 | 54 4.7 | 0.19 | U. 21 30.4 | 1.71 | 14 57.4 | 54 46.9 | 0.99 | U. 21 39.4 | 2.06 |
| 24.0 | 14 46.9 | 54 7.9 | 0.35 | L. 9 51.2 | 1.75 | 15 0.8 | 54 59.4 | 1.09 | L. 10 4.7 | 2.15 |
| 24.5 | 14 48.2 | 54 12.8 | 0.48 | U. 22 12.6 | 1.81 | 15 4.4 | 55 13.0 | 1.17 | U. 22 30.9 | 2.23 |
| 25.0 | 14 49.9 | 54 19.2 | 0.60 | L. 10 34.8 | 1.88 | 15 8.4 | 55 27.6 | 1.24 | L. 10 58.0 | 2.29 |
| 25.5 | 14 52.0 | 54 27.0 | 0.70 | U. 22 57.8 | 1.96 | 15 12.6 | 55 43.1 | 1.30 | U. 23 25.7 | 2.34 |
| 26.0 | 14 54.4 | 54 35.9 | 0.80 | L. 11 21.8 | 2.04 | 15 17.1 | 55 59.1 | 1.35 | L. 11 54.0 | 2.38 |
| 26.5 | 14 57.1 | 54 45.9 | 0.88 | U. 23 46.7 | 2.12 | 15 21.6 | 56 15.4 | 1.38 | | |
| 27.0 | 15 0.1 | 54 56.8 | 0.94 | | | 15 26.0 | 56 31.8 | 1.37 | U. 0 22.5 | 2.38 |
| 27.5 | 15 3.4 | 55 8.5 | 1.01 | L. 12 12.5 | 2.19 | 15 30.4 | 56 48.0 | 1.34 | L. 12 50.9 | 2.37 |
| 28.0 | 15 6.8 | 55 21.0 | 1.08 | U. 0 39.1 | 2.25 | 15 34.7 | 57 3.8 | 1.30 | U. 1 19.1 | 2.33 |
| 28.5 | 15 10.3 | 55 34.2 | 1.12 | L. 13 6.4 | 2.30 | 15 38.8 | 57 19.1 | 1.25 | L. 13 46.8 | 2.29 |
| 29.0 | 15 14.0 | 55 47.9 | 1.16 | U. 1 34.1 | 2.33 | 15 42.8 | 57 33.7 | 1.19 | U. 2 13.9 | 2.23 |
| 29.5 | 15 18.0 | 56 2.1 | 1.20 | L. 14 2.1 | 2.33 | 15 46.6 | 57 47.6 | 1.13 | L. 14 40.3 | 2.17 |
| 30.0 | 15 22.0 | 56 16.8 | 1.24 | U. 2 30.0 | 2.33 | 15 50.2 | 58 0.7 | 1.05 | U. 3 6.0 | 2.11 |
| 30.5 | 15 26.1 | 56 32.0 | 1.29 | L. 14 57.8 | 2.31 | 15 53.5 | 58 12.9 | 0.98 | L. 15 31.0 | 2.05 |
| 31.0 | 15 30.3 | 56 47.7 | 1.33 | U. 3 25.2 | 2.26 | 15 56.6 | 58 24.3 | 0.92 | U. 3 55.4 | 2.01 |
| 31.5 | 15 34.6 | 57 3.8 | +1.36 | L. 15 52.0 | 2.21 | 15 59.5 | 58 34.7 | +0.87 | L. 16 19.3 | 1.97 |

## WASHINGTON MEAN TIME.

### PHASES.

| Month. | New Moon. | First Quarter. | Full Moon. | Last Quarter. | New Moon. | First Quarter. |
|---|---|---|---|---|---|---|
| | d. h. m. | d. h. m. | d. h. m. | d. h. m. | | |
| January | 7 6 9.1 | 13 22 34.5 | 21 10 20.6 | 29 15 26.6 | | |
| February | 5 17 27.9 | 12 9 3.5 | 20 4 32.2 | 28 8 33.3 | | |
| March | 6 3 31.1 | 12 21 28.2 | 21 22 56.5 | 28 21 23.5 | | |
| April | 4 12 44.8 | 11 11 43.9 | 19 16 5.5 | 27 6 18.4 | | |
| May | 3 21 34.1 | 11 3 37.0 | 19 6 48.4 | 26 12 25.7 | | |
| June | 2 6 31.4 | 9 20 42.0 | 17 18 43.7 | 24 17 9.3 | d. h. m. | |
| July | 1 16 22.4 | 9 14 14.0 | 17 4 23.0 | 23 21 53.9 | 31 4 0.4 | |
| August | | 8 7 14.0 | 15 12 47.1 | 22 3 59.6 | 29 18 6.0 | |
| September | | 6 22 48.7 | 13 21 0.3 | 20 12 40.4 | 28 10 40.0 | |
| October | | 6 12 29.6 | 13 5 51.2 | 20 0 58.5 | 28 4 46.6 | |
| November | | 5 0 14.6 | 11 15 47.1 | 18 17 26.0 | 26 22 53.2 | |
| December | | 4 10 18.3 | 11 3 5.4 | 18 13 35.7 | 26 15 37.1 | |

### PERIGEE, APOGEE.

| Month. | Perigee. | Apogee. | Perigee. | GREATEST LIBRATION. | | |
|---|---|---|---|---|---|---|
| | d. h. | d. h. | d. h. | d. h. m. | d. h. m. | d. h. m. |
| January | 9 16.9 | 25 15.9 | | 3 21 16 S.E. | 16 21 1 S.W. | |
| February | 6 21.5 | 22 1.9 | | 1 0 38 S.E. | 13 6 47 S.W. | 29 7 36 S.E. |
| March | 6 8.3 | 20 3.5 | | | 12 10 6 S.W. | 28 12 3 S.E. |
| April | 3 19.5 | 16 11.6 | | | 9 16 50 S.W. | 25 5 25 N.E. |
| May | 2 1.5 | 14 2.6 | 29 18.9 | 7 20 50 N.W. | 21 21 40 S.E. | |
| June | | 10 20.3 | 24 16.0 | 4 17 12 N.W. | 17 8 17 S.E. | |
| July | | 8 13.8 | 20 15.5 | 1 23 33 N.W. | 14 15 33 S.E. | 28 9 27 S.W. |
| August | | 5 7.5 | 17 9.1 | | 17 12 15 S.E. | 24 3 18 S.W. |
| September | | 1 22.5 | 14 14.7 | 8 16 17 N.E. | 20 21 20 N.W. | |
| September | | 29 6.1 | | | | |
| October | 13 1.4 | 26 9.5 | | 6 23 0 N.E. | 19 1 49 N.W. | |
| November | 10 12.0 | 22 18.3 | | 4 2 26 N.E. | 16 8 46 N.W. | |
| December | 8 18.0 | 20 12.6 | | 1 13 10 N.E. | 14 12 23 N.W. | 27 16 39 N.E. |

### MOON'S EQUATOR.

The moon's libration in latitude and longitude, at any time, may be found by means of the following formulas and tables.

$I$ = the inclination of the moon's equator 1° 28′.8,

☊ = mean longitude of moon's ascending node (see page 246),

$C$ = the angle which the mean meridian of the moon's disc makes with the circle of declination reckoned from north to west on the apparent disc.

$\lambda$, $\beta$, $\alpha'$, and $\delta'$ the apparent longitude, latitude, right ascension, and declination of the moon affected with parallax.

$$\Delta\lambda = 0'.57 \sin 2\,(\lambda - \text{☊}),$$

$$a = \cos\,(\text{☊} - \lambda) \sin I,$$

$$\tan B = \sin\,(\text{☊} - \lambda) \tan I.$$

In these formulas, the tables p. 9 of the Appendix may be substituted.

The libration in latitude $= b = B - \beta$.

The libration in longitude $= l = \lambda + \Delta\lambda + a\,b - \text{☾}$.

$$\sin C = \sin i \,\frac{\cos\,(\text{☾} + l - \text{☊} + \Delta)}{\cos \delta'} = -\sin i \,\frac{\cos\,(\alpha' - \text{☊}')}{\cos b}.$$

## WASHINGTON MEAN TIME.

## MOON'S EQUATOR.

| Sidereal Date 0h. | i Inclination to the Earth's Equator. | | Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic. | | ☊′ Ascending Node on Earth's Equator. | | ☾ Moon's Mean Longitude. | |
|---|---|---|---|---|---|---|---|---|
| d. | ° | ′ | ° | ′ | ° | ′ | ° | ′ |
| 0 | 22 | 11.5 | 212 | 1.6 | 358 | 1.8 | 198 | 18.8 |
| 10 | 22 | 11.1 | 211 | 28.2 | 358 | 3.7 | 329 | 43.0 |
| 20 | 22 | 10.6 | 210 | 54.8 | 358 | 5.5 | 101 | 7.3 |
| 30 | 22 | 10.2 | 210 | 21.3 | 358 | 7.4 | 232 | 31.5 |
| 40 | 22 | 9.8 | 209 | 47.9 | 358 | 9.2 | 3 | 55.8 |
| 50 | 22 | 9.4 | 209 | 14.5 | 358 | 11.1 | 135 | 20.0 |
| 60 | 22 | 9.0 | 208 | 41.1 | 358 | 13.0 | 266 | 44.3 |
| 70 | 22 | 8.6 | 208 | 7.6 | 358 | 14.9 | 38 | 8.5 |
| 80 | 22 | 8.2 | 207 | 34.2 | 358 | 16.9 | 169 | 32.8 |
| 90 | 22 | 7.9 | 207 | 0.7 | 358 | 18.8 | 300 | 57.0 |
| 100 | 22 | 7.5 | 206 | 27.3 | 358 | 20.7 | 72 | 21.3 |
| 110 | 22 | 7.2 | 205 | 53.8 | 358 | 22.7 | 203 | 45.5 |
| 120 | 22 | 6.8 | 205 | 20.3 | 358 | 24.7 | 335 | 9.8 |
| 130 | 22 | 6.5 | 204 | 46.8 | 358 | 26.6 | 106 | 34.0 |
| 140 | 22 | 6.1 | 204 | 13.3 | 358 | 28.6 | 237 | 58.2 |
| 150 | 22 | 5.8 | 203 | 39.8 | 358 | 30.6 | 9 | 22.5 |
| 160 | 22 | 5.5 | 203 | 6.2 | 358 | 32.6 | 140 | 46.7 |
| 170 | 22 | 5.2 | 202 | 32.7 | 358 | 34.6 | 272 | 11.0 |
| 180 | 22 | 4.9 | 201 | 59.1 | 358 | 36.6 | 43 | 35.2 |
| 190 | 22 | 4.6 | 201 | 25.6 | 358 | 38.6 | 174 | 59.5 |
| 200 | 22 | 4.3 | 200 | 52 0 | 358 | 40.6 | 306 | 23.7 |
| 210 | 22 | 4.0 | 200 | 18.4 | 358 | 42.6 | 77 | 48.0 |
| 220 | 22 | 3.8 | 199 | 44.8 | 358 | 44.7 | 209 | 12.2 |
| 230 | 22 | 3.5 | 199 | 11.3 | 358 | 46.7 | 340 | 36.4 |
| 240 | 22 | 3.3 | 198 | 37.7 | 358 | 48.8 | 112 | 0.7 |
| 250 | 22 | 3.0 | 198 | 4.1 | 358 | 50.8 | 243 | 25.0 |
| 260 | 22 | 2.8 | 197 | 30.5 | 358 | 52.9 | 14 | 49.2 |
| 270 | 22 | 2.5 | 196 | 56.9 | 358 | 55.0 | 146 | 13.5 |
| 280 | 22 | 2.3 | 196 | 23.3 | 358 | 57.0 | 277 | 37.7 |
| 290 | 22 | 2.0 | 195 | 49.7 | 358 | 59.1 | 49 | 2.0 |
| 300 | 22 | 1.8 | 195 | 16.1 | 359 | 1.2 | 180 | 26.2 |
| 310 | 22 | 1.6 | 194 | 42.4 | 359 | 3.3 | 311 | 50.3 |
| 320 | 22 | 1.4 | 194 | 8.8 | 359 | 5.5 | 83 | 14.5 |
| 330 | 22 | 1.2 | 193 | 35.1 | 359 | 7.6 | 214 | 38.8 |
| 340 | 22 | 1.0 | 193 | 1.5 | 359 | 9.8 | 346 | 3.0 |
| 350 | 22 | 0.8 | 192 | 27.8 | 359 | 11.9 | 117 | 27.2 |
| 360 | 22 | 0.6 | 191 | 54.2 | 359 | 14.0 | 248 | 51.5 |
| 370 | 22 | 0.5 | 191 | 20.5 | 359 | 16.2 | 20 | 15.7 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | | | | Apparent Declination. | | | | | Log. Coefficient of *t*. | | Log. Coefficient of $t^2$. | | Mean Solar Time of Meridian Transit. | | | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | | | At Transit. | | At Mean Noon. | | | At Transit. | | In R.A. | In Dec. | In R.A. | In Dec. | | | | |
| d. | h. | m. | s. | m. | s. | ° | ′ | ″ | ′ | ″ | | | | | d. | h. | m. | d. |
| Jan. 1 | 18 | 48 | 29.10 | 48 | 30.97 | −24 | 49 | 11.1 | 49 | 9.9 | +9.47191 | +9.2942 | +3.32 | +5.33 | 1 | 0 | 6.3 | 0 |
| 2 | 18 | 55 | 36.37 | 55 | 39.19 | 24 | 43 | 44.1 | 43 | 41.6 | 9.47277 | 9.4134 | 3.31 | 5.35 | 2 | 0 | 9.5 | 1 |
| 3 | 19 | 2 | 44.49 | 2 | 48.27 | 24 | 36 | 46.2 | 36 | 42.1 | 9.47351 | 9.5082 | 3.18 | 5.34 | 3 | 0 | 12.7 | 2 |
| 4 | 19 | 9 | 53.22 | 9 | 57.96 | 24 | 28 | 17.1 | 28 | 11.0 | 9.47409 | 9.5867 | 3.09 | 5.35 | 4 | 0 | 15.9 | 3 |
| 5 | 19 | 17 | 2.47 | 17 | 8.17 | 24 | 18 | 15.6 | 18 | 7.0 | 9.47451 | 9.6535 | 2.90 | 5.35 | 5 | 0 | 19.1 | 4 |
| 6 | 19 | 24 | 12.05 | 24 | 18.70 | 24 | 6 | 41.0 | 6 | 29.5 | 9.47473 | 9.7120 | +2.42 | 5.35 | 6 | 0 | 22.3 | 5 |
| 7 | 19 | 31 | 21.75 | 31 | 29.36 | 23 | 53 | 32.7 | 53 | 17.9 | 9.47476 | 9.7641 | −2.16 | 5.36 | 7 | 0 | 25.5 | 6 |
| 8 | 19 | 38 | 31.39 | 38 | 39.95 | 23 | 38 | 49.9 | 38 | 31.4 | 9.47460 | 9.8106 | 2.78 | 5.36 | 8 | 0 | 28.7 | 7 |
| 9 | 19 | 45 | 40.78 | 45 | 50.29 | 23 | 22 | 32.2 | 22 | 9.5 | 9.47420 | 9.8528 | 3.12 | 5.36 | 9 | 0 | 31.9 | 8 |
| 10 | 19 | 52 | 49.64 | 53 | 0.09 | 23 | 4 | 39.5 | 4 | 12.1 | 9.47348 | 9.8912 | 3.33 | 5.36 | 10 | 0 | 35.2 | 9 |
| 11 | 19 | 59 | 57.62 | 60 | 8.99 | 22 | 45 | 11.6 | 44 | 39.2 | 9.47247 | 9.9267 | 3.43 | 5.36 | 11 | 0 | 38.3 | 10 |
| 12 | 20 | 7 | 4.48 | 7 | 16.76 | 22 | 24 | 8.3 | 23 | 30.5 | 9.47124 | 9.9594 | 3.49 | 5.36 | 12 | 0 | 41.5 | 11 |
| 13 | 20 | 14 | 10.07 | 14 | 23.24 | 22 | 1 | 29.9 | 0 | 46.3 | 9.46971 | 9.9896 | 3.62 | 5.36 | 13 | 0 | 44.7 | 12 |
| 14 | 20 | 21 | 13.92 | 21 | 27.95 | 21 | 37 | 17.2 | 36 | 27.4 | 9.46772 | 0.0177 | 3.71 | 5.35 | 14 | 0 | 47.8 | 13 |
| 15 | 20 | 28 | 15.65 | 28 | 30.51 | 21 | 11 | 30.9 | 10 | 34.6 | 9.46530 | 0.0439 | 3.79 | 5.35 | 15 | 0 | 50.9 | 14 |
| 16 | 20 | 35 | 14.83 | 35 | 30.47 | 20 | 44 | 12.1 | 43 | 9.0 | 9.46239 | 0.0682 | 3.87 | 5.34 | 16 | 0 | 53.9 | 15 |
| 17 | 20 | 42 | 10.95 | 42 | 27.32 | 20 | 15 | 22.2 | 14 | 12.1 | 9.45890 | 0.0907 | 3.94 | 5.33 | 17 | 0 | 56.9 | 16 |
| 18 | 20 | 49 | 3.45 | 49 | 20.51 | 19 | 45 | 4.0 | 43 | 46.6 | 9.45475 | 0.1115 | 4.01 | 5.31 | 18 | 0 | 59.9 | 17 |
| 19 | 20 | 55 | 51.70 | 56 | 9.36 | 19 | 13 | 20.2 | 11 | 55.5 | 9.44983 | 0.1307 | 4.08 | 5.30 | 19 | 1 | 2.7 | 18 |
| 20 | 21 | 2 | 34.97 | 2 | 53.19 | 18 | 40 | 14.2 | 38 | 42.2 | 9.44401 | 0.1481 | 4.15 | 5.27 | 20 | 1 | 5.5 | 19 |
| 21 | 21 | 9 | 12.43 | 9 | 31.08 | 18 | 5 | 50.6 | 4 | 11.1 | 9.43715 | 0.1639 | 4.21 | 5.24 | 21 | 1 | 8.2 | 20 |
| 22 | 21 | 15 | 43.16 | 16 | 2.15 | 17 | 30 | 14.8 | 28 | 28.2 | 9.42903 | 0.1779 | 4.28 | 5.20 | 22 | 1 | 10.7 | 21 |
| 23 | 21 | 22 | 6.06 | 22 | 25.28 | 16 | 53 | 33.3 | 51 | 40.0 | 9.41946 | 0.1900 | 4.34 | 5.14 | 23 | 1 | 13.2 | 22 |
| 24 | 21 | 28 | 19.94 | 28 | 39.25 | 16 | 15 | 54.1 | 13 | 54.5 | 9.40815 | 0.2002 | 4.40 | 5.08 | 24 | 1 | 15.5 | 23 |
| 25 | 21 | 34 | 23.40 | 34 | 42.64 | 15 | 37 | 26.5 | 35 | 21.2 | 9.39475 | 0.2082 | 4.46 | 4.95 | 25 | 1 | 17.6 | 24 |
| 26 | 21 | 40 | 14.90 | 40 | 33.90 | 14 | 58 | 21.5 | 56 | 11.4 | 9.37886 | 0.2140 | 4.52 | 4.77 | 26 | 1 | 19.5 | 25 |
| 27 | 21 | 45 | 52.72 | 46 | 11.29 | 14 | 18 | 51.9 | 16 | 38.0 | 9.36000 | 0.2172 | 4.58 | +4.38 | 27 | 1 | 21.2 | 26 |
| 28 | 21 | 51 | 14.94 | 51 | 32.88 | 13 | 39 | 12.3 | 36 | 56.0 | 9.33746 | 0.2175 | 4.63 | −4.21 | 28 | 1 | 22.6 | 27 |
| 29 | 21 | 56 | 19.44 | 56 | 36.52 | 12 | 59 | 39.3 | 57 | 22.1 | 9.31048 | 0.2145 | 4.68 | 4.79 | 29 | 1 | 23.7 | 28 |
| 30 | 22 | 1 | 3.93 | 1 | 19.92 | 12 | 20 | 31.9 | 18 | 15.6 | 9.27795 | 0.2078 | 4.73 | 5.05 | 30 | 1 | 24.5 | 29 |
| 31 | 22 | 5 | 25.97 | 5 | 40.63 | 11 | 42 | 11.1 | 39 | 57.5 | 9.23848 | 0.1968 | 4.78 | 5.22 | 31 | 1 | 24.9 | 30 |
| Feb. 1 | 22 | 9 | 23.03 | 9 | 36.14 | 11 | 4 | 59.6 | 2 | 50.9 | 9.19009 | 0.1809 | 4.82 | 5.35 | 1 | 1 | 24.9 | 31 |
| 2 | 22 | 12 | 52.49 | 13 | 3.83 | 10 | 29 | 21.6 | 27 | 19.8 | 9.12980 | 0.1654 | 4.86 | 5.46 | 2 | 1 | 24.5 | 32 |
| 3 | 22 | 15 | 51.74 | 16 | 1.14 | 9 | 55 | 42.4 | 53 | 49.5 | 9.05298 | 0.1306 | 4.90 | 5.55 | 3 | 1 | 23.6 | 33 |
| 4 | 22 | 18 | 18.22 | 18 | 25.50 | 9 | 24 | 29.0 | 22 | 47.2 | 8.95136 | 0.0935 | 4.93 | 5.62 | 4 | 1 | 22.1 | 34 |
| 5 | 22 | 20 | 9.60 | 20 | 14.69 | 8 | 56 | 8.3 | 54 | 39.3 | 8.80872 | 0.0460 | 4.95 | 5.68 | 5 | 1 | 20.0 | 35 |
| 6 | 22 | 21 | 24.02 | 21 | 26.91 | 8 | 31 | 4.9 | 29 | 50.3 | 8.58115 | 9.9848 | 4.97 | 5.73 | 6 | 1 | 17.3 | 36 |
| 7 | 22 | 21 | 59.77 | 22 | 0.53 | 8 | 9 | 44.4 | 8 | 45.1 | +8.03961 | 9.9050 | 4.98 | 5.77 | 7 | 1 | 13.9 | 37 |
| 8 | 22 | 21 | 55.94 | 21 | 54.78 | 7 | 52 | 27.8 | 51 | 43.9 | −8.21958 | 9.7980 | 4.98 | 5.80 | 8 | 1 | 9.9 | 38 |
| 9 | 22 | 21 | 12.37 | 21 | 9.46 | 7 | 39 | 33.2 | 39 | 4.4 | 8.64282 | 9.6448 | 4.97 | 5.82 | 9 | 1 | 5.3 | 39 |
| 10 | 22 | 19 | 49.72 | 19 | 45.46 | 7 | 31 | 13.8 | 30 | 59.0 | 8.84804 | 9.3943 | 4.96 | 5.83 | 10 | 0 | 59.9 | 40 |
| 11 | 22 | 17 | 49.65 | 17 | 44.47 | 7 | 27 | 36.3 | 27 | 33.5 | 8.98013 | +8.7196 | 4.92 | 5.83 | 11 | 0 | 53.9 | 41 |
| 12 | 22 | 15 | 14.86 | 15 | 9.21 | 7 | 28 | 40.5 | 28 | 47.2 | 9.07311 | −9.1513 | 4.87 | 5.82 | 12 | 0 | 47.5 | 42 |
| 13 | 22 | 12 | 9.06 | 12 | 3.45 | 7 | 34 | 21.1 | 34 | 34.3 | 9.14064 | 9.5156 | 4.80 | 5.80 | 13 | 0 | 40.4 | 43 |
| 14 | 22 | 8 | 36.90 | 8 | 31.79 | 7 | 44 | 21.2 | 44 | 37.7 | 9.18904 | 9.6990 | 4.70 | 5.76 | 14 | 0 | 33.0 | 44 |
| 15 | 22 | 4 | 44.13 | 4 | 39.92 | 7 | 58 | 19.5 | 58 | 36.0 | 9.22205 | 9.8164 | 4.55 | 5.70 | 15 | 0 | 25.2 | 45 |
| 16 | 22 | 0 | 36.77 | 0 | 33.77 | 8 | 15 | 47.0 | 16 | 0.6 | 9.24215 | 9.8968 | −4.30 | 5.62 | 16 | 0 | 17.1 | 46 |
| 17 | 21 | 56 | 21.21 | 56 | 19.63 | 8 | 36 | 9.3 | 36 | 17.3 | 9.25035 | 9.9529 | +3.53 | 5.52 | 17 | 0 | 8.9 | 47 |
| 18 | 21 | 52 | 4.22 | 52 | 4.11 | 8 | 58 | 50.3 | 58 | 50.9 | 9.24743 | 9.9912 | 4.07 | 5.38 | 18 | 0 | 0.6 | 48 |
| 19 | 21 | 47 | 52.06 | 47 | 53.35 | 9 | 23 | 10.5 | 23 | 2.7 | 9.23399 | 0.0151 | 4.41 | 5.17 | 18 | 23 | 52.5 | 49 |
| 20 | 21 | 43 | 50.54 | 43 | 53.05 | 9 | 48 | 32.1 | 48 | 15.6 | 9.21005 | 0.0276 | 4.58 | −4.78 | 19 | 23 | 45.5 | 50 |
| 21 | 21 | 40 | 4.81 | 40 | 8.28 | 10 | 14 | 19.0 | 13 | 54.2 | 9.17546 | 0.0301 | 4.68 | +4.24 | 20 | 23 | 36.8 | 51 |
| 22 | 21 | 36 | 39.03 | 36 | 43.15 | 10 | 39 | 58.9 | 39 | 26.6 | 9.12963 | 0.0242 | 4.75 | 4.92 | 21 | 23 | 29.5 | 52 |
| 23 | 21 | 33 | 36.48 | 33 | 40.90 | 11 | 5 | 4.2 | 4 | 25.7 | 9.07075 | 0.0106 | 4.80 | 5.16 | 22 | 23 | 22.5 | 53 |
| 24 | 21 | 30 | 59.90 | 31 | 4.28 | 11 | 29 | 10.2 | 28 | 27.2 | 8.99657 | 9.9899 | 4.82 | 5.27 | 23 | 23 | 15.9 | 54 |
| 25 | 21 | 28 | 50.55 | 28 | 54.57 | 11 | 51 | 58.7 | 51 | 12.7 | 8.90297 | 9.9629 | 4.83 | 5.35 | 24 | 23 | 9.8 | 55 |
| 26 | 21 | 27 | 9.36 | 27 | 12.75 | 12 | 13 | 14.7 | 12 | 27.3 | 8.78074 | 9.9294 | 4.84 | 5.40 | 25 | 23 | 4.2 | 56 |
| 27 | 21 | 25 | 56.51 | 25 | 59.01 | 12 | 32 | 47.5 | 32 | 0.2 | 8.61003 | 9.8897 | 4.83 | 5.43 | 26 | 22 | 59.0 | 57 |
| 28 | 21 | 25 | 11.83 | 25 | 13.27 | 12 | 50 | 29.3 | 49 | 43.6 | 8.33254 | 9.8432 | 4.82 | 5.45 | 27 | 22 | 54.4 | 58 |
| 29 | 21 | 24 | 54.37 | 24 | 54.61 | 13 | 6 | 15.2 | 5 | 32.2 | −7.46919 | 9.7891 | 4.80 | 5.46 | 28 | 22 | 50.1 | 59 |
| 30 | 21 | 25 | 3.13 | 25 | 2.04 | 13 | 20 | 2.0 | 19 | 12.8 | +8.17224 | 9.7259 | 4.78 | 5.46 | 29 | 22 | 46.3 | 60 |
| 31 | 21 | 25 | 37.08 | 25 | 34.65 | −13 | 31 | 48.3 | 31 | 13.7 | +8.50393 | −9.6519 | +4.76 | +5.46 | 1 | 22 | 42.9 | 61 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of *t*. |  | Log. Coefficient of *t*². |  | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit |
|---|---|---|---|---|---|---|---|---|---|---|
|  | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |  |  |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  | d. h. m. | d. |
| Mar. 1 | 21 25 3.13 | 25 2.04 | −13 20 2.0 | 19 12.8 | +8.17224 | −9.7259 | +4.78 | +5.46 | 0 22 46.3 | 60 |
| 2 | 21 25 37.08 | 25 34.65 | 13 31 48.3 | 31 13.7 | 8.50393 | 9.6519 | 4.76 | 5.46 | 1 22 42.9 | 61 |
| 3 | 21 26 34.82 | 26 31.01 | 13 41 34.6 | 41 5.4 | 8.68060 | 9.5626 | 4.73 | 5.46 | 2 22 39.9 | 62 |
| 4 | 21 27 54.90 | 27 49.73 | 13 49 21.4 | 48 58.0 | 8.79909 | 9.4518 | 4.70 | 5.46 | 3 22 37.4 | 63 |
| 5 | 21 29 35.95 | 29 29.44 | 13 55 10.2 | 54 53.1 | 8.88661 | 9.3048 | 4.67 | 5.45 | 4 22 35.1 | 64 |
| 6 | 21 31 36.52 | 31 28.71 | 13 59 2.9 | 58 52.4 | 8.95539 | 9.0847 | 4.64 | 5.44 | 5 22 33.2 | 65 |
| 7 | 21 33 55.25 | 33 46.23 | 14 1 1.7 | 0 57.9 | 9.00970 | −8.6375 | 4.61 | 5.43 | 6 22 31.5 | 66 |
| 8 | 21 36 30.84 | 36 20.66 | 14 1 9.0 | 1 12.0 | 9.05514 | +8.5229 | 4.58 | 5.42 | 7 22 30.2 | 67 |
| 9 | 21 39 22.05 | 39 10.80 | 13 59 26.9 | 59 36.7 | 9.09330 | 9.0348 | 4.54 | 5.41 | 8 22 29.1 | 68 |
| 10 | 21 42 27.69 | 42 15.45 | 13 55 57.8 | 56 14.5 | 9.12588 | 9.2599 | 4.51 | 5.40 | 9 22 28.2 | 69 |
| 11 | 21 45 46.73 | 45 33.58 | 13 50 44.2 | 51 7.6 | 9.15399 | 9.4039 | 4.47 | 5.39 | 10 22 27.6 | 70 |
| 12 | 21 49 18.11 | 49 4.13 | 13 43 48.8 | 44 18.9 | 9.17843 | 9.5100 | 4.44 | 5.38 | 11 22 27.2 | 71 |
| 13 | 21 53 0.90 | 52 46.17 | 13 35 12.9 | 35 49.5 | 9.19989 | 9.5941 | 4.41 | 5.37 | 12 22 27.0 | 72 |
| 14 | 21 56 54.29 | 56 38.89 | 13 24 59.3 | 25 42.1 | 9.21884 | 9.6625 | 4.37 | 5.36 | 13 22 26.9 | 73 |
| 15 | 22 0 57.45 | 0 41.45 | 13 13 9.3 | 13 58.1 | 9.23570 | 9.6907 | 4.34 | 5.35 | 14 22 27.0 | 74 |
| 16 | 22 5 9.70 | 4 53.18 | 12 59 45.9 | 59 40.6 | 9.25080 | 9.7711 | 4.31 | 5.35 | 15 22 27.3 | 75 |
| 17 | 22 9 30.37 | 9 13.39 | 12 44 50.2 | 45 50.6 | 9.27234 | 9.8155 | 4.27 | 5.34 | 16 22 27.7 | 76 |
| 18 | 22 13 58.90 | 13 41.55 | 12 28 24.1 | 29 29.9 | 9.27658 | 9.8549 | 4.25 | 5.33 | 17 22 28.2 | 77 |
| 19 | 22 18 34.73 | 18 17.06 | 12 10 28.9 | 11 39.7 | 9.28774 | 9.8905 | 4.22 | 5.32 | 18 22 28.9 | 78 |
| 20 | 22 23 17.42 | 22 59.48 | 11 51 6.7 | 52 22.4 | 9.29793 | 9.9228 | 4.19 | 5.31 | 19 22 29.7 | 79 |
| 21 | 22 28 6.51 | 27 48.35 | 11 30 18.8 | 31 39.0 | 9.30727 | 9.9524 | 4.16 | 5.31 | 20 22 30.5 | 80 |
| 22 | 22 33 1.63 | 32 43.32 | 11 8 6.7 | 9 31.2 | 9.31591 | 9.9496 | 4.14 | 5.30 | 21 22 31.5 | 81 |
| 23 | 22 38 2.46 | 37 44.03 | 10 44 31.6 | 46 0.9 | 9.32391 | 0.0049 | 4.11 | 5.29 | 22 22 32.6 | 82 |
| 24 | 22 43 8.67 | 42 50.16 | 10 19 34.8 | 21 6.8 | 9.33135 | 0.0283 | 4.09 | 5.28 | 23 22 33.7 | 83 |
| 25 | 22 48 20.00 | 48 1.47 | 9 53 18.3 | 54 53.8 | 9.33837 | 0.0502 | 4.07 | 5.28 | 24 22 35.0 | 84 |
| 26 | 22 53 36.29 | 53 17.77 | 9 25 43.2 | 27 21.6 | 9.34501 | 0.0707 | 4.05 | 5.27 | 25 22 36.3 | 85 |
| 27 | 22 58 57.28 | 58 38.80 | 8 56 50.1 | 58 31.3 | 9.35128 | 0.0901 | 4.04 | 5.27 | 26 22 37.7 | 86 |
| 28 | 23 4 22.83 | 4 4.43 | 8 26 40.1 | 28 23.9 | 9.35729 | 0.1085 | 4.03 | 5.26 | 27 22 39.2 | 87 |
| 29 | 23 9 52.81 | 9 34.52 | 7 55 14.5 | 57 0.5 | 9.36310 | 0.1256 | 4.02 | 5.25 | 28 22 40.8 | 88 |
| 30 | 22 15 27.21 | 15 9.07 | 7 22 34.8 | 24 22.5 | 9.36867 | 0.1420 | 4.01 | 5.24 | 29 22 42.4 | 89 |
| 31 | 23 21 5.82 | 20 47.85 | 6 48 41.4 | 50 30.5 | 9.37411 | 0.1575 | 4.01 | 5.23 | 30 22 44.1 | 90 |
| Apr. 1 | 23 26 48.67 | 26 30.90 | 6 13 36.9 | 14 27.2 | 9.37947 | 0.1722 | 4.01 | 5.23 | 0 22 45.9 | 91 |
| 2 | 23 32 35.73 | 32 18.19 | 5 37 21.6 | 39 12.6 | 9.38475 | 0.1861 | 4.01 | 5.22 | 1 22 47.7 | 92 |
| 3 | 23 38 27.02 | 38 9.74 | 4 59 56.8 | 61 48.2 | 9.38998 | 0.1995 | 4.01 | 5.22 | 2 22 49.6 | 93 |
| 4 | 23 44 22.54 | 44 5.55 | 4 21 23.7 | 23 15.1 | 9.39519 | 0.2121 | 4.02 | 5.21 | 3 22 51.6 | 94 |
| 5 | 23 50 22.36 | 50 5.68 | 3 41 43.1 | 43 34.3 | 9.40043 | 0.2243 | 4.02 | 5.20 | 4 22 53.6 | 95 |
| 6 | 23 56 26.57 | 56 10.22 | 3 0 57.5 | 2 48.0 | 9.40570 | 0.2358 | 4.03 | 5.19 | 5 22 55.8 | 96 |
| 7 | 0 2 35.22 | 2 19.24 | 2 19 7.7 | 20 57.2 | 9.41102 | 0.2469 | 4.05 | 5.18 | 6 22 58.0 | 98 |
| 8 | 0 8 48.48 | 8 32.90 | 1 36 13.7 | 38 1.8 | 9.41644 | 0.2574 | 4.46 | 5.17 | 7 23 0.3 | 99 |
| 9 | 0 15 6.45 | 14 51.29 | 0 52 18.9 | 54 5.1 | 9.42195 | 0.2673 | 4.07 | 5.13 | 8 23 2.6 | 100 |
| 10 | 0 21 29.27 | 21 14.56 | − 0 7 24.4 | 9 8.4 | 9.42757 | 0.2768 | 4.09 | 5.14 | 9 23 5.1 | 101 |
| 11 | 0 27 57.17 | 27 42.95 | + 0 38 28.0 | 36 46.7 | 9.43333 | 0.2858 | 4.09 | 5.13 | 10 23 7.6 | 102 |
| 12 | 0 34 30.28 | 34 16.58 | 1 25 16.0 | 23 37.9 | 9.43919 | 0.2943 | 4.10 | 5.11 | 11 23 10.2 | 103 |
| 13 | 0 41 8.79 | 40 55.66 | 2 12 57.9 | 11 23.4 | 9.44521 | 0.3022 | 4.12 | 5.09 | 12 23 12.9 | 104 |
| 14 | 0 47 52.94 | 47 40.41 | 3 1 30.5 | 0 0.1 | 9.45139 | 0.3095 | 4.13 | 5.06 | 13 23 16.7 | 105 |
| 15 | 0 54 42.96 | 54 31.07 | 3 50 51.4 | 49 25.6 | 9.45768 | 0.3164 | 4.15 | 5.03 | 14 23 18.6 | 106 |
| 16 | 1 1 38.98 | 1 27.79 | 4 40 56.9 | 39 36.1 | 9.46408 | 0.3226 | 4.16 | 4.99 | 15 23 21.6 | 107 |
| 17 | 1 8 41.26 | 8 30.81 | 5 31 43.4 | 30 38.2 | 9.47060 | 0.3281 | 4.18 | 4.95 | 16 23 24.7 | 108 |
| 18 | 1 15 49.97 | 15 40.32 | 6 23 6.6 | 21 57.4 | 9.47719 | 0.3329 | 4.19 | 4.89 | 17 23 27.9 | 109 |
| 19 | 1 23 5.27 | 22 56.49 | 7 15 1.8 | 13 59.1 | 9.48387 | 0.3370 | 4.20 | 4.80 | 18 23 31.2 | 110 |
| 20 | 1 30 27.37 | 30 19.51 | 8 7 23.4 | 6 27.8 | 9.49056 | 0.3402 | 4.22 | 4.68 | 19 23 34.6 | 111 |
| 21 | 1 37 56.29 | 37 49.42 | 8 60 5.0 | 59 16.9 | 9.49712 | 0.3425 | 4.22 | 4.50 | 20 23 38.1 | 112 |
| 22 | 1 45 31.98 | 45 26.17 | 9 52 59.7 | 52 19.5 | 9.50357 | 0.3437 | 4.21 | +4.10 | 21 23 41.8 | 113 |
| 23 | 1 53 14.43 | 53 9.76 | 10 45 59.6 | 45 27.7 | 9.51005 | 0.3438 | 4.21 | −3.96 | 22 23 45.6 | 114 |
| 24 | 2 1 3.93 | 1 0.46 | 11 38 55.9 | 38 32.6 | 9.51628 | 0.3426 | 4.23 | 4.51 | 23 23 49.4 | 115 |
| 25 | 2 8 59.84 | 8 57.65 | 12 31 38.9 | 31 24.5 | 9.52207 | 0.3401 | 4.19 | 4.75 | 24 23 53.4 | 116 |
| 26 | 2 17 2.05 | 17 1.21 | 13 23 58.4 | 23 53.0 | 9.52753 | 0.3360 | 4.18 | 4.93 | 25 23 57.5 | 117 |
| 27 | 2 25 10.11 | 25 10.69 | 14 15 42.6 | 15 39.0 | 9.53248 | 0.3303 | 4.15 | 5.05 | 27 0 1.7 | 118 |
| 28 | 2 33 23.44 | 33 25.50 | 15 6 40.2 | 6 27.6 | 9.53682 | 0.3227 | 4.11 | 5.15 | 28 0 6.0 | 119 |
| 29 | 2 41 41.39 | 41 44.98 | 15 56 38.7 | 56 17.4 | 9.54050 | 0.3131 | 4.05 | 5.24 | 29 0 10.3 | 120 |
| 30 | 2 50 3.18 | 50 8.34 | 16 45 25.1 | 44 55.5 | 9.54342 | 0.3016 | 3.96 | 5.31 | 30 0 14.8 | 121 |
| 31 | 2 58 27.90 | 58 34.65 | +17 32 47.2 | 32 9.9 | +9.54548 | +9.2877 | +3.85 | −5.37 | 31 0 19.2 | 122 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of *t*. | | Log. Coefficient of *t*². | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | | d. h. m. | d. |
| May 1 | 2 58 27.90 | 58 34.65 | +17 32 47.2 | 32 9.9 | +9.54548 | +0.2877 | +3.65 | −5.37 | 1 0 19.2 | 122 |
| 2 | 3 6 54.49 | 7 2.84 | 18 18 32.8 | 17 48.4 | 9.54660 | 0.2715 | +3.26 | 5.42 | 2 0 23.7 | 123 |
| 3 | 3 15 21.85 | 15 31.79 | 19 2 30.4 | 1 39.8 | 9.54673 | 0.2528 | −3.03 | 5.46 | 3 0 28.2 | 124 |
| 4 | 3 23 48.77 | 24 0.28 | 19 44 29.1 | 43 33.3 | 9.54581 | 0.2314 | 3.61 | 5.49 | 4 0 32.7 | 125 |
| 5 | 3 32 14.02 | 32 27.05 | 20 24 19.6 | 23 19.6 | 9.54385 | 0.2073 | 3.84 | 5.52 | 5 0 37.2 | 126 |
| 6 | 3 40 36.39 | 40 50.86 | 21 1 53.6 | 0 50.5 | 9.54080 | 0.1804 | 4.00 | 5.54 | 6 0 41.7 | 127 |
| 7 | 3 48 54.61 | 49 10.45 | 21 37 4.7 | 35 59.6 | 9.53666 | 0.1504 | 4.11 | 5.55 | 7 0 46.0 | 128 |
| 8 | 3 57 7.51 | 57 24.61 | 22 9 48.0 | 8 42.1 | 9.53147 | 0.1172 | 4.19 | 5.56 | 8 0 50.3 | 129 |
| 9 | 4 5 13.97 | 5 32.22 | 22 39 59.7 | 38 54.1 | 9.52520 | 0.0807 | 4.26 | 5.57 | 9 0 54.5 | 130 |
| 10 | 4 13 12.85 | 13 32.13 | 23 7 38.3 | 6 34.1 | 9.51787 | 0.0404 | 4.32 | 5.57 | 10 0 58.5 | 131 |
| 11 | 4 21 3.17 | 21 23.33 | 23 32 43.2 | 31 41.4 | 9.50952 | 9.9962 | 4.36 | 5.57 | 11 1 2.4 | 132 |
| 12 | 4 28 44.01 | 29 4.92 | 23 55 15.3 | 54 16.8 | 9.50016 | 9.9473 | 4.40 | 5.56 | 12 1 6.1 | 133 |
| 13 | 4 36 14.49 | 36 36.01 | 24 15 16.4 | 14 22.0 | 9.48980 | 9.8932 | 4.43 | 5.55 | 13 1 9.7 | 134 |
| 14 | 4 43 33.84 | 43 55.81 | 24 32 49.4 | 31 59.7 | 9.47842 | 9.8326 | 4.46 | 5 54 | 14 1 13.1 | 135 |
| 15 | 4 50 41.33 | 51 3.62 | 24 47 57.9 | 47 13.5 | 9.46603 | 9.7649 | 4.48 | 5.53 | 15 1 16.3 | 136 |
| 16 | 4 57 36.29 | 57 58.75 | 25 0 46.9 | 0 8.4 | 9 45266 | 9.6871 | 4.50 | 5.51 | 16 1 19.2 | 137 |
| 17 | 5 4 18.26 | 4 40.73 | 25 11 20.5 | 10 48.2 | 9.43817 | 9.5956 | 4.52 | 5.50 | 17 1 22.0 | 138 |
| 18 | 5 10 46.44 | 11 8.79 | 25 19 43.4 | 19 17.6 | 9.42263 | 9.4846 | 4.53 | 5.48 | 18 1 24.5 | 139 |
| 19 | 5 17 0.62 | 17 22.71 | 25 26 0.8 | 25 41.7 | 9.40596 | 9.3427 | 4.55 | 5.46 | 19 1 26.8 | 140 |
| 20 | 5 23 0.10 | 23 21.78 | 25 30 19.1 | 30 6.7 | 9.38792 | 9.1448 | 4.56 | 5.44 | 20 1 28.8 | 141 |
| 21 | 5 28 44.43 | 29 5.58 | 25 32 44.2 | 32 38.5 | 9.36858 | +8.7983 | 4.57 | 5.41 | 21 1 30.6 | 142 |
| 22 | 5 34 13.29 | 34 33.80 | 25 33 21.8 | 33 20.9 | 9.34781 | −7.9878 | 4.59 | 5.39 | 22 1 32.2 | 143 |
| 23 | 5 39 26.18 | 39 45.92 | 25 32 17.4 | 32 10.1 | 9.32536 | 8.8947 | 4.60 | 5.37 | 23 1 33.5 | 144 |
| 24 | 5 44 22.70 | 44 41.56 | 25 29 36.4 | 29 22.9 | 9.30108 | 9.1566 | 4.61 | 5.34 | 24 1 34.5 | 145 |
| 25 | 5 49 2.47 | 49 20.35 | 25 25 24.9 | 25 5.5 | 9.27472 | 9.3107 | 4.62 | 5.31 | 25 1 35.2 | 146 |
| 26 | 5 53 25.06 | 53 41.86 | 25 19 48.2 | 19 23.2 | 9.24595 | 9.4180 | 4.63 | 5.28 | 26 1 35.6 | 147 |
| 27 | 5 57 30.07 | 57 45.75 | 25 12 51.9 | 12 21.8 | 9.21537 | 9.4982 | 4.64 | 5.25 | 27 1 35.8 | 148 |
| 28 | 6 1 17.16 | 1 31.57 | 25 4 41.7 | 4 6.9 | 9.17972 | 9.5618 | 4.65 | 5.22 | 28 1 35.6 | 149 |
| 29 | 6 4 45.90 | 4 59.00 | 24 55 22.3 | 54 43.3 | 9.14113 | 9.6132 | 4.65 | 5.18 | 29 1 35.1 | 150 |
| 30 | 6 7 55.94 | 8 7.71 | 24 44 59.6 | 44 16.9 | 9.09796 | 9.6559 | 4.66 | 5.15 | 30 1 34.4 | 151 |
| 31 | 6 10 46.97 | 10 57.37 | 24 33 38.6 | 32 52.8 | 9.04923 | 9.6917 | 4.67 | 5.11 | 31 1 33.3 | 152 |
| June 1 | 6 13 18.70 | 13 27.70 | 24 21 24.1 | 20 35.7 | 8.99332 | 9.7216 | 4.68 | 5.07 | 1 1 31.8 | 153 |
| 2 | 6 15 30.76 | 15 38.34 | 24 8 21.4 | 7 31.1 | 8.92794 | 9.7472 | 4.69 | 5.02 | 2 1 30.1 | 154 |
| 3 | 6 17 22.85 | 17 29.03 | 23 54 35.3 | 53 43.7 | 8.84999 | 9.7685 | 4.69 | 4.96 | 3 1 28.0 | 155 |
| 4 | 6 18 54.81 | 18 59.63 | 23 40 11.1 | 39 18.7 | 8.75439 | 9.7866 | 4.69 | 4.91 | 4 1 25.6 | 156 |
| 5 | 6 20 6.62 | 20 10.14 | 23 25 13.4 | 24 20.9 | 8.63134 | 9.8016 | 4.69 | 4.83 | 5 1 22.9 | 157 |
| 6 | 6 20 58.11 | 21 0.37 | 23 9 47.5 | 8 55.5 | 8.45847 | 9.8136 | 4.69 | 4.75 | 6 1 19.8 | 158 |
| 7 | 6 21 29.53 | 21 30.64 | 22 53 58.1 | 53 7.3 | 8.16883 | 9.8232 | 4.68 | 4.64 | 7 1 16.4 | 159 |
| 8 | 6 21 40.85 | 21 40.90 | 22 37 50.5 | 37 1.4 | +6.99291 | 9.8302 | 4.68 | 4.50 | 8 1 12.6 | 160 |
| 9 | 6 21 32.51 | 21 31.63 | 22 21 29.8 | 20 43.0 | −8.09711 | 9.8346 | 4.67 | 4.23 | 9 1 8.5 | 161 |
| 10 | 6 21 4.97 | 21 3.32 | 22 5 1.9 | 4 17.9 | 8.40729 | 9.8368 | 4.65 | −3.36 | 10 1 4.1 | 162 |
| 11 | 6 20 19.07 | 20 16.80 | 21 48 32.1 | 47 51.4 | 8.58055 | 9.8364 | 4.63 | +3.90 | 11 0 59.4 | 163 |
| 12 | 6 19 15.45 | 19 12.73 | 21 32 5.5 | 31 28.4 | 8.69857 | 9.8335 | 4.60 | 4.37 | 12 0 54.4 | 164 |
| 13 | 6 17. 55.30 | 17 52.30 | 21 15 48.7 | 15 15.6 | 8.78505 | 9.8277 | 4.56 | 4.59 | 13 0 49.1 | 165 |
| 14 | 6 16 19.98 | 16 16.88 | 20 59 48.1 | 59 19.3 | 8.85102 | 9.8189 | 4.52 | 4.74 | 14 0 43.6 | 166 |
| 15 | 6 14 31.02 | 14 28.00 | 20 44 10.1 | 43 45.8 | 8.90215 | 9.8071 | 4.46 | 4.84 | 15 0 37.9 | 167 |
| 16 | 6 12 30.15 | 12 27.36 | 20 29 1.0 | 28 41.3 | 8.94164 | 9.7915 | 4.38 | 4.94 | 16 0 31.9 | 168 |
| 17 | 6 10 19.29 | 10 16.88 | 20 14 27.9 | 14 12.7 | 8.97128 | 9.7718 | 4.28 | 5.03 | 17 0 25.8 | 169 |
| 18 | 6 8 0.62 | 7 58.70 | 20 0 37.8 | 0 26.9 | 8.99224 | 9.7474 | 4.12 | 5.08 | 18 0 19.5 | 170 |
| 19 | 6 5 36.43 | 5 35.10 | 19 47 37.4 | 47 30.5 | 9.00535 | 9.7179 | 3.88 | 5.14 | 19 0 13.2 | 171 |
| 20 | 6 3 9.07 | 3 8.37 | 19 35 33.7 | 35 30.5 | 9.01112 | 8.6818 | −3.26 | 5.18 | 20 0 6.8 | 172 |
| 21 | 6 0 40.96 | 0 40.92 | 19 24 33.4 | 24 33.2 | 9.00943 | 9.6379 | +3.66 | 5.22 | 21 0 0.4 | 173 |
| 22 | 5 58 14.76 | 58 15.36 | 19 14 42.4 | 14 40.1 | 9.00041 | 9.5848 | 4.00 | 5.26 | 21 23 54.0 | 174 |
| 23 | 5 55 52.68 | 55 53.87 | 19 6 6.2 | 6 2.1 | 8.98393 | 9.5193 | 4.20 | 5.29 | 22 23 47.7 | 175 |
| 24 | 5 53 37.18 | 53 38.87 | 18 58 50.1 | 58 45.0 | 8.95905 | 9.4371 | 4.33 | 5.31 | 23 23 41.5 | 176 |
| 25 | 5 51 30.55 | 51 32.62 | 18 52 57.8 | 52 52.5 | 8.92490 | 9.3309 | 4.42 | 5.32 | 24 23 35.4 | 177 |
| 26 | 5 49 34.85 | 49 37.16 | 18 48 32.6 | 48 27.9 | 8.88000 | 9.1851 | 4.49 | 5.33 | 25 23 29.6 | 178 |
| 27 | 5 47 52.02 | 47 54.41 | 18 45 36.5 | 45 33.2 | 8.82157 | −8.9573 | 4.55 | 5.34 | 26 23 23.9 | 179 |
| 28 | 5 46 23.79 | 46 26.10 | 18 44 10.9 | 44 9.9 | 8.74532 | +8.4437 | 4.59 | 5.34 | 27 23 18.5 | 180 |
| 29 | 5 45 11.69 | 45 13.75 | 18 44 15.5 | 44 13.9 | 8.64270 | 8.5362 | 4.63 | 5.33 | 28 23 13.4 | 181 |
| 30 | 5 44 17.17 | 44 18.80 | 18 45 49.6 | 45 44.7 | 8.49662 | 8.9815 | 4.65 | 5.32 | 29 23 8.5 | 182 |
| 31 | 5 43 41.21 | 43 42.24 | +18 48 50.9 | 48 42.2 | −8.25925 | +9.1909 | +4.67 | +5.31 | 30 23 4.0 | 183 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of t. |  | Log. Coefficient of t². |  | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |  |  |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  | d. h. m. | d. |
| July 1 | 5 43 41.21 | 43 42.24 | +18 48 50.9 | 48 42.2 | −8.25925 | +9.1909 | +4.67 | +5.31 | 0 23 4.0 | 183 |
| 2 | 5 43 24.72 | 43 24.99 | 18 53 15.8 | 53 3.0 | −7.63636 | 9.3602 | 4.69 | 5.29 | 1 22 59.7 | 184 |
| 3 | 5 43 28.59 | 43 27.96 | 18 59 1.1 | 58 44.0 | +8.00101 | 9.4254 | 4.70 | 5.26 | 2 22 55.9 | 185 |
| 4 | 5 43 53.43 | 43 51.77 | 19 6 2.4 | 5 40.9 | 8.39380 | 9.5011 | 4.71 | 5.23 | 3 22 52.3 | 186 |
| 5 | 5 44 39.73 | 44 36.93 | 19 14 13.3 | 13 47.6 | 8.59942 | 9.5601 | 4.72 | 5.18 | 4 22 49.2 | 187 |
| 6 | 5 45 47.75 | 45 43.73 | 19 23 27.4 | 22 57.6 | 8.73963 | 9.6073 | 4.72 | 5.14 | 5 22 46.4 | 188 |
| 7 | 5 47 17.68 | 47 12.36 | 19 33 38.5 | 33 4.9 | 8.84657 | 9.6451 | 4.73 | 5.08 | 6 22 43.9 | 189 |
| 8 | 5 49 9.82 | 49 3.14 | 19 44 39.2 | 44 2.2 | 8.93287 | 9.6751 | 4.73 | 5.00 | 7 22 41.8 | 190 |
| 9 | 5 51 24.21 | 51 16.16 | 19 56 21.5 | 55 41.6 | 9.00500 | 9.6984 | 4.73 | 4.90 | 8 22 40.1 | 191 |
| 10 | 5 54 0.93 | 53 51.49 | 20 8 36.5 | 7 54.3 | 9.06691 | 9.7150 | 4.73 | 4.76 | 9 22 38.8 | 192 |
| 11 | 5 56 59.93 | 56 49.10 | 20 21 15.2 | 20 31.5 | 9.12097 | 9.7263 | 4.73 | 4.55 | 10 22 37.8 | 193 |
| 12 | 6 0 21.17 | 0 8.99 | 20 34 8.8 | 33 24.4 | 9.16900 | 9.7482 | 4.73 | +4.15 | 11 22 37.3 | 194 |
| 13 | 6 4 4.67 | 3 51.18 | 20 47 7.6 | 46 23.2 | 9.21201 | 9.7482 | 4.72 | −4.07 | 12 22 37.0 | 195 |
| 14 | 6 8 10.15 | 7 55.43 | 20 60 1.7 | 59 17.8 | 9.25073 | 9.7259 | 4.72 | 4.59 | 13 22 37.2 | 196 |
| 15 | 6 12 37.39 | 12 21.51 | 21 12 39.4 | 11 56.8 | 9.28602 | 9.7135 | 4.72 | 4.81 | 14 22 37.7 | 197 |
| 16 | 6 17 26.28 | 17 9.35 | 21 24 50.4 | 24 10.1 | 9.31840 | 9.6941 | 4.71 | 4.96 | 15 22 38.6 | 198 |
| 17 | 6 22 36 58 | 22 18.72 | 21 36 23.5 | 35 46.3 | 9.34809 | 9.6664 | 4.71 | 5.08 | 16 22 39.8 | 199 |
| 18 | 6 28 7.90 | 27 49.26 | 21 47 6.5 | 46 33.1 | 9.37537 | 9.6284 | 4.70 | 5.17 | 17 22 41.4 | 200 |
| 19 | 6 33 59.79 | 33 47.52 | 21 56 47.9 | 56 18.9 | 9.40048 | 9.5772 | 4.69 | 5.25 | 18 22 43.3 | 201 |
| 20 | 6 40 11.79 | 39 52.06 | 22 5 15.5 | 4 51.5 | 9.42354 | 9.5086 | 4.67 | 5.32 | 19 22 45.6 | 202 |
| 21 | 6 46 43.18 | 46 23.18 | 22 12 17.5 | 11 58.9 | 9.44460 | 9.4128 | 4.65 | 5.37 | 20 22 48.1 | 203 |
| 22 | 6 53 33.10 | 53 13.04 | 22 17 41.5 | 17 28.7 | 9.46376 | 9.3166 | 4.63 | 5.42 | 21 22 51.0 | 204 |
| 23 | 7 0 40.65 | 0 20.73 | 22 21 16.3 | 21 9.3 | 9.48114 | 9.0278 | 4.60 | 5.46 | 22 22 54.2 | 205 |
| 24 | 7 8 4.81 | 7 45.24 | 22 22 50.5 | 22 49.3 | 9.49676 | +8.2888 | 4.57 | 5.50 | 23 22 57.7 | 206 |
| 25 | 7 15 44.30 | 15 25.31 | 22 22 14.2 | 22 9.9 | 9.51057 | −8.8710 | 4.53 | 5.53 | 24 23 1.4 | 207 |
| 26 | 7 23 37.68 | 23 19.47 | 22 19 18.4 | 19 8.9 | 9.52256 | 9.2396 | 4.47 | 5.55 | 25 23 5.3 | 208 |
| 27 | 7 31 43.30 | 31 26.07 | 22 13 55.7 | 13 41.6 | 9.53272 | 9.4448 | 4.40 | 5.57 | 26 23 9.5 | 209 |
| 28 | 7 39 59.42 | 39 43.37 | 22 5 58.9 | 5 41.0 | 9.54110 | 9.5875 | 4.32 | 5.58 | 27 23 13.8 | 210 |
| 29 | 7 48 24.20 | 48 9.47 | 21 55 23.7 | 55 3.0 | 9.54778 | 9.6969 | 4.22 | 5.59 | 28 23 18.3 | 211 |
| 30 | 7 56 55.83 | 56 42.57 | 21 42 8.5 | 41 45.9 | 9.55278 | 9.7844 | 4.08 | 5.59 | 29 23 22.9 | 212 |
| 31 | 8 5 32.44 | 5 20.75 | 21 26 13.3 | 25 50.0 | 9.55617 | 9.8570 | 3.88 | 5.58 | 30 23 27.5 | 213 |
| Aug. 1 | 8 14 12.19 | 14 2.16 | 21 7 39.2 | 7 16.2 | 9.55803 | 9.9183 | +3.50 | 5.58 | 0 23 32.3 | 214 |
| 2 | 8 22 53.27 | 22 44.95 | 20 46 29.3 | 46 7.8 | 9.55837 | 9.9707 | −3.09 | 5.56 | 1 23 37.0 | 215 |
| 3 | 8 31 33.85 | 31 27.26 | 20 22 49.7 | 22 30.8 | 9.55723 | 0.0153 | 3.73 | 5.54 | 2 23 41.7 | 216 |
| 4 | 8 40 12.22 | 40 7.35 | 19 56 48.1 | 56 32.7 | 9.55482 | 0.0541 | 3.93 | 5.52 | 3 23 46.4 | 217 |
| 5 | 8 48 47.08 | 48 43.90 | 19 28 29.9 | 28 19.0 | 9.55142 | 0.0878 | 4.05 | 5.49 | 4 23 51.1 | 218 |
| 6 | 8 57 17.36 | 57 15.82 | 18 58 4.4 | 57 58.7 | 9.54705 | 0.1171 | 4.13 | 5.45 | 5 23 55.6 | 219 |
| 7 | 9 5 42.06 | 5 42.10 | 18 25 41.1 | 25 41.0 | 9.54186 | 0.1423 | 4.19 | 5.42 | 7 0 0.1 | 220 |
| 8 | 9 14 0.30 | 14 1.83 | 17 51 29.5 | 51 23.0 | 9.53590 | 0.1643 | 4.24 | 5.38 | 8 0 4.4 | 221 |
| 9 | 9 22 11.36 | 22 14.30 | 17 15 39.0 | 15 25.8 | 9.52930 | 0.1833 | 4.27 | 5.33 | 9 0 8.7 | 222 |
| 10 | 9 30 14.69 | 30 18.95 | 16 38 19.3 | 37 59.1 | 9.52223 | 0.1997 | 4.29 | 5.29 | 10 0 12.8 | 223 |
| 11 | 9 38 10.03 | 38 15.52 | 15 59 39.0 | 59 11.5 | 9.51478 | 0.2139 | 4.30 | 5.23 | 11 0 16.8 | 224 |
| 12 | 9 45 57.06 | 46 3.69 | 15 19 47.8 | 19 13.1 | 9.50698 | 0.2260 | 4.31 | 5.18 | 12 0 20.6 | 225 |
| 13 | 9 53 35.64 | 53 43.31 | 14 38 53.5 | 38 11.6 | 9.49898 | 0.2364 | 4.31 | 5.12 | 13 0 24.3 | 226 |
| 14 | 10 1 5.77 | 1 14.40 | 13 57 4.3 | 56 15.2 | 9 49082 | 0.2454 | 4.31 | 5.06 | 14 0 27.9 | 227 |
| 15 | 10 8 27.46 | 8 36.97 | 13 14 27.4 | 13 31.4 | 9.48259 | 0.2528 | 4.30 | 4.99 | 15 0 31.3 | 228 |
| 16 | 10 15 40.83 | 15 51.14 | 12 31 9.6 | 30 6.8 | 9.47430 | 0.2591 | 4.30 | 4.92 | 16 0 34.6 | 229 |
| 17 | 10 22 46.00 | 22 57.03 | 11 47 17.7 | 46 8.4 | 9.46604 | 0.2643 | 4.29 | 4.84 | 17 0 37.7 | 230 |
| 18 | 10 29 43.18 | 29 54.87 | 11 2 57.4 | 1 41.9 | 9.45783 | 0.2685 | 4.27 | 4.75 | 18 0 40.7 | 231 |
| 19 | 10 36 32.59 | 36 44.88 | 10 18 13.9 | 16 52.3 | 9.44969 | 0.2718 | 4.26 | 4.64 | 19 0 43.6 | 232 |
| 20 | 10 43 14.43 | 43 27.25 | 9 33 12.2 | 31 45.0 | 9.44164 | 0.2744 | 4.25 | 4.53 | 20 0 46.4 | 233 |
| 21 | 10 49 48.94 | 50 2.24 | 8 47 57.2 | 46 24.7 | 9.43373 | 0.2762 | 4.23 | 4.38 | 21 0 49.0 | 234 |
| 22 | 10 56 16.40 | 56 30.14 | 8 2 32.3 | 0 54.7 | 9.42597 | 0.2774 | 4.22 | −4.07 | 22 0 51.5 | 235 |
| 23 | 11 2 37.05 | 2 51.18 | 7 17 2.4 | 15 20.1 | 9.41832 | 0.2779 | 4.20 | +3.56 | 23 0 53.9 | 236 |
| 24 | 11 8 51.12 | 9 5.59 | 6 31 31.0 | 29 44.4 | 9.41082 | 0.2779 | 4.18 | 3.61 | 24 0 56.2 | 237 |
| 25 | 11 14 58.85 | 15 13.63 | 5 46 1.2 | 44 10.6 | 9.40342 | 0.2774 | 4.16 | 4.05 | 25 0 58.4 | 238 |
| 26 | 11 21 0.48 | 21 15.54 | 4 60 35.9 | 58 41.6 | 9.39630 | 0.2765 | 4.15 | 4.26 | 26 1 0.5 | 239 |
| 27 | 11 26 56.25 | 27 11.56 | 4 15 18.0 | 13 20.3 | 9.38928 | 0.2750 | 4.13 | 4.40 | 27 1 2.5 | 240 |
| 28 | 11 32 46.37 | 33 1.89 | 3 30 10.5 | 28 9.9 | 9.38240 | 0 2732 | 4.12 | 4.49 | 28 1 4.4 | 241 |
| 29 | 11 38 31.04 | 38 46.75 | 2 45 15.8 | 43 12.4 | 9.37562 | 0.2709 | 4.11 | 4.56 | 29 1 6.2 | 242 |
| 30 | 11 44 10.42 | 44 26.30 | 1 60 36.1 | 58 30.2 | 9.36899 | 0.2682 | 4.09 | 4.63 | 30 1 7.9 | 243 |
| 31 | 11 49 44.71 | 50 0.72 | + 1 16 14.0 | 14 6.0 | +9.36244 | −0.2652 | −4.08 | +4.67 | 31 1 9.5 | 244 |

FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t. | | Log. Coefficient of t². | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | | d. h. m. | d. |
| Sept. 1 | 11 55 14.02 | 55 30.15 | + 0 32 11.5 | 36 1.6 | +9.35599 | −0.2618 | −4.07 | +4.72 | 1 1 11.1 | 245 |
| 2 | 12 0 38.52 | 0 54.74 | − 0 11 29.3 | 13 40.6 | 9.34963 | 0.2580 | 4.05 | 4.76 | 2 1 12.5 | 246 |
| 3 | 12 5 58.33 | 6 14.62 | 0 54 46.2 | 56 58.8 | 9.34333 | 0.2538 | 4.05 | 4.80 | 3 1 13.9 | 247 |
| 4 | 12 11 13.53 | 11 29.87 | 1 37 36.4 | 39 50.0 | 9.33702 | 0.2492 | 4.04 | 4.83 | 4 1 15.2 | 248 |
| 5 | 12 16 24.20 | 16 40.57 | 2 19 59.3 | 22 13.5 | 9.33074 | 0.2443 | 4.03 | 4.86 | 5 1 16.4 | 249 |
| 6 | 12 21 30.41 | 21 46.79 | 3 1 52.3 | 4 6.9 | 9.32443 | 0.2391 | 4.03 | 4.88 | 6 1 17.6 | 250 |
| 7 | 12 26 32.18 | 26 48.55 | 3 43 13.7 | 45 28.3 | 9.31804 | 0.2333 | 4.03 | 4.91 | 7 1 18.7 | 251 |
| 8 | 12 31 29.51 | 31 45.85 | 4 24 1.4 | 26 15.9 | 9.31156 | 0.2271 | 4.03 | 4.94 | 8 1 19.7 | 252 |
| 9 | 12 36 22.41 | 36 38.69 | 5 4 13.0 | 6 27.0 | 9.30499 | 0.2204 | 4.03 | 4.97 | 9 1 20.6 | 253 |
| 10 | 12 41 10.88 | 41 27.08 | 5 43 46.1 | 45 59.3 | 9.29822 | 0.2132 | 4.04 | 4.99 | 10 1 21.5 | 254 |
| 11 | 12 45 54.80 | 46 10.90 | 6 22 38.7 | 24 50.9 | 9.29117 | 0.2054 | 4.05 | 5.02 | 11 1 22.3 | 255 |
| 12 | 12 50 34.04 | 50 50.00 | 7 0 48.4 | 2 59.1 | 9.28379 | 0.1970 | 4.06 | 5.03 | 12 1 23.0 | 256 |
| 13 | 12 55 8.48 | 55 24.25 | 7 38 13.1 | 40 22.1 | 9.27528 | 0.1882 | 4.08 | 5.05 | 13 1 23.6 | 257 |
| 14 | 12 59 37.97 | 59 53.52 | 8 14 51.2 | 16 58.3 | 9.26794 | 0.1788 | 4.09 | 5.07 | 14 1 24.2 | 258 |
| 15 | 13 4 2.32 | 4 17.64 | 8 50 40.9 | 52 45.8 | 9.25841 | 0.1646 | 4.12 | 5.09 | 15 1 24.7 | 259 |
| 16 | 13 8 21.24 | 8 36.31 | 9 25 38.9 | 27 41.3 | 9.24906 | 0.1576 | 4.14 | 5.13 | 16 1 25.0 | 260 |
| 17 | 13 12 34.46 | 12 49.28 | 9 59 41.6 | 61 40.8 | 9.23986 | 0.1454 | 4.16 | 5.16 | 17 1 25.3 | 261 |
| 18 | 13 16 41.66 | 16 56.14 | 10 32 44.7 | 34 40.5 | 9.22884 | 0.1319 | 4.20 | 5.19 | 18 1 25.5 | 262 |
| 19 | 13 20 42.36 | 20 56.45 | 11 4 44.3 | 6 36.3 | 9.21662 | 0.1171 | 4.23 | 5.20 | 19 1 25.6 | 263 |
| 20 | 13 24 36.03 | 24 49.67 | 11 35 37.3 | 37 25.2 | 9.20310 | 0.1010 | 4.26 | 5.23 | 20 1 25.5 | 264 |
| 21 | 13 28 22.20 | 28 35.34 | 12 5 19.8 | 7 3.2 | 9.18814 | 0.0833 | 4.29 | 5.25 | 21 1 25.3 | 265 |
| 22 | 13 32 0.32 | 32 12.92 | 12 33 47.9 | 35 26.4 | 9.17128 | 0.0637 | 4.33 | 5.29 | 22 1 25.0 | 266 |
| 23 | 13 35 29.59 | 35 41.57 | 13 0 55.7 | 2 28.7 | 9.15210 | 0.0414 | 4.36 | 5.32 | 23 1 24.6 | 267 |
| 24 | 13 38 49.24 | 39 0.54 | 13 26 37.3 | 28 4.4 | 9.13017 | 0.0163 | 4.40 | 5.35 | 24 1 24.0 | 268 |
| 25 | 13 41 58.39 | 42 8.95 | 13 50 46.8 | 52 7.6 | 9.10488 | 9.9876 | 4.42 | 5.38 | 25 1 23.2 | 269 |
| 26 | 13 44 56.06 | 45 5.81 | 14 13 17.3 | 14 31.3 | 9.07536 | 9.9544 | 4.48 | 5.41 | 26 1 22.2 | 270 |
| 27 | 13 47 41.14 | 47 50.00 | 14 34 0.9 | 35 7.6 | 9.04055 | 9.9154 | 4.52 | 5.44 | 27 1 21.0 | 271 |
| 28 | 13 50 12.42 | 50 20.33 | 14 52 49.2 | 53 48.0 | 8.99892 | 9.8690 | 4.56 | 5.48 | 28 1 19.6 | 272 |
| 29 | 13 52 28.61 | 52 35.50 | 15 9 32.8 | 10 23.4 | 8.94820 | 9.8125 | 4.60 | 5.51 | 29 1 17.9 | 273 |
| 30 | 13 54 28.22 | 54 34.01 | 15 24 1.1 | 24 43.0 | 8.88487 | 9.7415 | 4.64 | 5.55 | 30 1 16.0 | 274 |
| Oct. 1 | 13 56 9.75 | 56 14.40 | 15 36 2.6 | 36 35.4 | 8.80346 | 9.6485 | 4.68 | 5.58 | 1 1 13.7 | 275 |
| 2 | 13 57 31.59 | 57 35.06 | 15 45 24.6 | 45 48.0 | 8.69300 | 9.5179 | 4.71 | 5.62 | 2 1 11.1 | 276 |
| 3 | 13 58 32.00 | 58 34.29 | 15 51 52.9 | 52 6.8 | 8.52947 | 9.3100 | 4.75 | 5.66 | 3 1 8.2 | 277 |
| 4 | 13 59 9.27 | 59 10.36 | 15 55 14.5 | 55 19.0 | +8.23551 | −8.8351 | 4.78 | 5.69 | 4 1 4.9 | 278 |
| 5 | 13 59 21.75 | 59 21.68 | 15 55 11.9 | 55 16.6 | −6.78777 | +8.8830 | 4.81 | 5.73 | 5 1 1.1 | 279 |
| 6 | 13 59 7.73 | 59 6.60 | 15 51 29.2 | 51 42.7 | 8.28945 | 9.3744 | 4.83 | 5.75 | 6 0 57.0 | 280 |
| 7 | 13 58 25.90 | 58 23.84 | 15 43 51.4 | 44 12.6 | 8.59279 | 9.6081 | 4.84 | 5.78 | 7 0 52.3 | 281 |
| 8 | 13 57 15.21 | 57 12.39 | 15 32 2.9 | 32 30.5 | 8.77395 | 9.7667 | 4.85 | 5.80 | 8 0 47.2 | 282 |
| 9 | 13 55 35.00 | 55 31.68 | 15 15 50.3 | 16 22.4 | 8.90250 | 9.8868 | 4.85 | 5.82 | 9 0 41.6 | 283 |
| 10 | 13 53 25.35 | 53 21.80 | 14 55 5.5 | 55 39.6 | 9.00023 | 9.9831 | 4.84 | 5.83 | 10 0 35.5 | 284 |
| 11 | 13 50 47 06 | 50 43.61 | 14 29 42.2 | 30 15.5 | 9.07662 | 0.0620 | 4.81 | 5.82 | 11 0 28.9 | 285 |
| 12 | 13 47 41 97 | 47 38.97 | 13 59 45.0 | 60 14.3 | 9.13638 | 0.1270 | 4.76 | 5.80 | 12 0 21.9 | 286 |
| 13 | 13 44 12.98 | 44 10.78 | 13 25 25.8 | 25 47.6 | 9.18195 | 0.1799 | 4.68 | 5.77 | 13 0 14.4 | 287 |
| 14 | 13 40 24.24 | 40 23.14 | 12 47 8.8 | 47 19.9 | 9.21457 | 0.2216 | 4.54 | 5.69 | 14 0 6.7 | 288 |
| 15 | 13 36 21.07 | 36 21.29 | 12 5 30.3 | 5 32.6 | 9.23481 | 0.2524 | 4.29 | 5.56 | 14 23 58.7 | 289 |
| 16 | 13 32 9.76 | 32 11.41 | 11 21 20.0 | 21 37.7 | 9.24270 | 0.2726 | −3.36 | 5.36 | 15 23 50.6 | 290 |
| 17 | 13 27 57.48 | 28 0.52 | 10 35 35.7 | 36 9.3 | 9.23778 | 0.2818 | +4.20 | +4.73 | 16 23 42.4 | 291 |
| 18 | 13 23 51.78 | 23 56.02 | 9 49 29.0 | 50 17.7 | 9.21924 | 0.2796 | 4.54 | −4.99 | 17 23 34.4 | 292 |
| 19 | 13 20 0.27 | 20 5.39 | 9 4 12.6 | 5 14.1 | 9.18557 | 0.2655 | 4.71 | 5.48 | 18 23 26.6 | 293 |
| 20 | 13 16 30.11 | 16 35.69 | 8 21 1.7 | 22 12.5 | 9.13441 | 0.2387 | 4.83 | 5.66 | 19 23 19.1 | 294 |
| 21 | 18 13 27.61 | 13 33.10 | 7 41 1.4 | 42 16.9 | 9.06171 | 0.1983 | 4.95 | 5.78 | 20 23 12.2 | 295 |
| 22 | 13 10 57.91 | 11 2.83 | 7 5 12.9 | 6 28.2 | 8.95969 | 0.1423 | 4.97 | 5.86 | 21 23 5.7 | 296 |
| 23 | 13 9 4.87 | 9 8.75 | 6 34 22.5 | 35 32.8 | 8.81288 | 0.0677 | 4.99 | 5.91 | 22 22 59.9 | 297 |
| 24 | 13 7 50.86 | 7 53.27 | 6 9 4.9 | 10 5.7 | 8.57222 | 9.9692 | 4.98 | 5.93 | 23 22 54.7 | 298 |
| 25 | 13 7 16.99 | 7 17.59 | 5 49 36.9 | 50 24.8 | −7.95558 | 9.8364 | 4.97 | 5.93 | 24 22 50.2 | 299 |
| 26 | 13 7 23.05 | 7 21.75 | 5 36 6.2 | 36 38.6 | +8.25101 | 9.6430 | 4.95 | 5.93 | 25 22 46.4 | 300 |
| 27 | 13 8 7.94 | 8 4.58 | 5 28 28.2 | 28 43.5 | 8.64470 | +9.2988 | 4.92 | 5.91 | 26 22 43.2 | 301 |
| 28 | 13 9 29.76 | 9 24.33 | 5 26 29.5 | 26 31.8 | 8.83823 | −8.4700 | 4.88 | 5.89 | 27 22 40.6 | 302 |
| 29 | 13 11 26.00 | 11 18.56 | 5 29 49.9 | 30 9.6 | 8.96309 | 9.3845 | 4.84 | 5.85 | 28 22 38.6 | 303 |
| 30 | 13 13 53.93 | 13 44.62 | 5 38 4.6 | 38 40.8 | 9.05227 | 9.6406 | 4.79 | 5.81 | 29 22 37.1 | 304 |
| 31 | 13 16 50.55 | 16 39.53 | 5 50 46.3 | 51 37.7 | 9.11957 | 9.7876 | 4.74 | 5.76 | 30 22 36.1 | 305 |
| 32 | 13 20 12.88 | 20 0.36 | − 6 7 27.6 | 8 32.6 | +9.17197 | −9.8864 | +4.69 | −5.71 | 31 22 35.5 | 306 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$. |  | Log. Coefficient of $t^2$. |  | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |  |  |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  | d. h. m. | d. |
| Nov. 1 | 13 20 12.88 | 20 0.36 | − 6 7 27.6 | 8 32.6 | +9.17197 | −9.8864 | +4.69 | −5.71 | 0 22 35.5 | 306 |
| 2 | 13 23 58.08 | 23 44.27 | 6 27 40.3 | 28 57.0 | 9.21343 | 9.9574 | 4.63 | 5.65 | 1 22 35.4 | 307 |
| 3 | 13 28 3.37 | 27 48.48 | 6 50 56.1 | 52 22.6 | 9.24689 | 0.0104 | 4.57 | 5.58 | 2 22 35.5 | 308 |
| 4 | 13 32 26.27 | 32 10.49 | 7 16 48.5 | 18 23.1 | 9.27413 | 0.0510 | 4.50 | 5.50 | 3 22 35.9 | 309 |
| 5 | 13 37 4.50 | 36 48.02 | 7 44 53.5 | 46 34.4 | 9.29642 | 0.0828 | 4.45 | 5.43 | 4 22 36.6 | 310 |
| 6 | 13 41 55.95 | 41 38.93 | 8 14 50.8 | 16 36.6 | 9.31499 | 0.1074 | 4.38 | 5.35 | 5 22 37.6 | 311 |
| 7 | 13 46 59.09 | 46 41.69 | 8 46 20.3 | 48 9.1 | 9.33045 | 0.1264 | 4.32 | 5.24 | 6 22 38.7 | 312 |
| 8 | 13 52 12.11 | 51 54.46 | 9 19 2.3 | 20 53.2 | 9.34326 | 0.1407 | 4.26 | 5.14 | 7 22 39.9 | 313 |
| 9 | 13 57 33.70 | 57 15.93 | 9 52 41.2 | 54 32.8 | 9.35409 | 0.1515 | 4.19 | 5.01 | 8 22 41.4 | 314 |
| 10 | 14 3 2.78 | 2 44.98 | 10 27 2.8 | 28 54.1 | 9.36327 | 0.1592 | 4.13 | 4.87 | 9 22 42.9 | 315 |
| 11 | 14 8 38.29 | 8 20.56 | 11 1 55.0 | 3 45.2 | 9.37109 | 0.1643 | 4.08 | 4.66 | 10 22 44.5 | 316 |
| 12 | 14 14 19.45 | 14 1.85 | 11 37 6.1 | 38 54.4 | 9.37783 | 0.1672 | 4.03 | 4.34 | 11 22 46.3 | 317 |
| 13 | 14 20 5.55 | 19 48.16 | 12 12 26.4 | 14 12.3 | 9.38368 | 0.1681 | 3.97 | −2.98 | 12 22 48.1 | 318 |
| 14 | 14 25 56.05 | 25 38.92 | 12 47 47.1 | 49 30.1 | 9.38879 | 0.1677 | 3.92 | +4.10 | 13 22 50.0 | 319 |
| 15 | 14 31 50.42 | 31 33.59 | 13 23 2.7 | 24 42.3 | 9.39328 | 0.1656 | 3.89 | 4.54 | 14 22 52.0 | 320 |
| 16 | 14 37 48.25 | 37 31.77 | 13 58 3.8 | 59 39.7 | 9.39732 | 0.1621 | 3.85 | 4.66 | 15 22 54.0 | 321 |
| 17 | 14 43 49.27 | 43 33.17 | 14 32 46.0 | 34 17.8 | 9.40098 | 0.1575 | 3.81 | 4.79 | 16 22 56.1 | 322 |
| 18 | 14 49 53.19 | 49 37.51 | 15 7 2.5 | 8 30.2 | 9.40430 | 0.1517 | 3.79 | 4.84 | 17 22 58.2 | 323 |
| 19 | 14 55 59.79 | 55 44.55 | 15 40 50.6 | 42 13.8 | 9.40738 | 0.1451 | 3.76 | 4.91 | 18 23 0.4 | 324 |
| 20 | 15 2 8.91 | 1 54.14 | 16 14 5.2 | 15 23.9 | 9.41027 | 0.1374 | 3.73 | 4.95 | 19 23 2.6 | 325 |
| 21 | 15 8 20.43 | 8 6.15 | 16 46 42.8 | 47 57.1 | 9.41296 | 0.1288 | 3.73 | 4.99 | 20 23 4.8 | 326 |
| 22 | 15 14 34.17 | 14 20.40 | 17 18 39.7 | 19 49.4 | 9.41555 | 0.1193 | 3.71 | 5.02 | 21 23 7.1 | 327 |
| 23 | 15 20 50.14 | 20 36.90 | 17 49 53.4 | 50 58.4 | 9.41805 | 0.1088 | 3.69 | 5.04 | 22 23 9.4 | 328 |
| 24 | 15 27 8.24 | 26 55.55 | 18 20 20.7 | 21 21.1 | 9.42046 | 0.0975 | 3.70 | 5.07 | 23 23 11.8 | 329 |
| 25 | 15 33 28.38 | 33 16.25 | 18 49 59.5 | 50 55.2 | 9.42283 | 0.0853 | 3.70 | 5.09 | 24 23 14.2 | 330 |
| 26 | 15 39 50.63 | 39 39.08 | 19 18 46.8 | 19 38.1 | 9.42520 | 0.0722 | 3.69 | 5.11 | 25 23 16.6 | 331 |
| 27 | 15 46 14.96 | 46 4.01 | 19 46 41.4 | 47 28.2 | 9.42752 | 0.0581 | 3.68 | 5.12 | 26 23 19.1 | 332 |
| 28 | 15 52 41.29 | 52 30.95 | 20 13 39.7 | 14 22.2 | 9.42975 | 0.0429 | 3.69 | 5.13 | 27 23 21.6 | 333 |
| 29 | 15 59 9.62 | 58 59.91 | 20 39 41.6 | 40 19.8 | 9.43200 | 0.0272 | 3.68 | 5.15 | 28 23 24.1 | 334 |
| 30 | 16 5 39.97 | 5 30.91 | 21 4 46.4 | 5 20.5 | 9.43423 | 0.0100 | 3.68 | 5.17 | 29 23 26.7 | 335 |
| Dec. 1 | 16 12 12.31 | 12 3.91 | 21 28 50.1 | 29 20.2 | 9.43643 | 9.9910 | 3.69 | 5.19 | 0 23 29.3 | 336 |
| 2 | 16 18 46.64 | 18 38.92 | 21 51 48.1 | 52 14.3 | 9.43863 | 9.9702 | 3.68 | 5.20 | 1 23 31.9 | 337 |
| 3 | 16 25 22.97 | 25 15.95 | 22 13 40.5 | 14 3.1 | 9.44082 | 9.9490 | 3.68 | 5.20 | 2 23 34.6 | 338 |
| 4 | 16 32 1.29 | 31 54.98 | 22 34 29.9 | 34 49.1 | 9.44299 | 9.9264 | 3.66 | 5.21 | 3 23 37.3 | 339 |
| 5 | 16 38 41.62 | 38 36.04 | 22 54 12.2 | 54 28.2 | 9.44510 | 9.9012 | 3.68 | 5.22 | 4 23 40.0 | 340 |
| 6 | 16 45 23.85 | 45 19.02 | 23 12 45.5 | 12 58.4 | 9.44720 | 9.8739 | 3.66 | 5.23 | 5 23 42.7 | 341 |
| 7 | 16 52 8.05 | 52 3.98 | 23 30 7.6 | 30 17.7 | 9.44927 | 9.8442 | 3.65 | 5.24 | 6 23 45.5 | 342 |
| 8 | 16 58 54.15 | 58 50.86 | 23 46 18.7 | 46 26.3 | 9.45130 | 9.8125 | 3.65 | 5.24 | 7 23 48.4 | 343 |
| 9 | 17 5 42.12 | 5 39.62 | 24 1 18.6 | 1 23.9 | 9.45328 | 9.7766 | 3.63 | 5.25 | 8 23 51.2 | 344 |
| 10 | 17 12 31.97 | 12 30.29 | 24 15 2.4 | 15 5.6 | 9.45522 | 9.7365 | 3.61 | 5.26 | 9 23 54.1 | 345 |
| 11 | 17 19 23.60 | 19 22.74 | 24 27 30.2 | 27 31.7 | 9.45707 | 9.6914 | 3.63 | 5.27 | 10 23 57.0 | 346 |
| 12 | 17 26 16.93 | 26 16.92 | 24 38 38.8 | 38 38.9 | 9.45888 | 9.6410 | 3.57 | 5.28 | 12 0 0.0 | 347 |
| 13 | 17 33 12.03 | 33 12.88 | 24 48 31.6 | 48 32.7 | 9.46061 | 9.5836 | 3.56 | 5.29 | 13 0 2.9 | 348 |
| 14 | 17 40 8.68 | 40 10.40 | 24 57 3.7 | 57 5.6 | 9.46220 | 9.5142 | 3.53 | 5.30 | 14 0 5.9 | 349 |
| 15 | 17 47 6.85 | 47 9.46 | 25 4 13.6 | 4 16.0 | 9.46372 | 9.4305 | 3.50 | 5.31 | 15 0 9.0 | 350 |
| 16 | 17 54 6.41 | 54 9.91 | 25 10 0.5 | 10 3.0 | 9.46511 | 9.3252 | 3.45 | 5.31 | 16 0 12.0 | 351 |
| 17 | 18 1 7.28 | 1 11.70 | 25 14 23.3 | 14 25.6 | 9.46639 | 9.1831 | 3.40 | 5.32 | 17 0 15.1 | 352 |
| 18 | 18 8 9.31 | 8 14.65 | 25 17 20.5 | 17 22.2 | 9.46752 | 8.9655 | 3.34 | 5.32 | 18 0 18.2 | 353 |
| 19 | 18 15 12.39 | 15 18.65 | 25 18 51.1 | 18 51.8 | 9.46851 | −8.5091 | 3.24 | 5.33 | 19 0 21.3 | 354 |
| 20 | 18 22 16.37 | 22 23.56 | 25 18 54.9 | 18 55.6 | 9.46935 | +8.4649 | 3.14 | 5.34 | 20 0 24.4 | 355 |
| 21 | 18 29 21.07 | 29 29.19 | 25 17 28.5 | 17 31.0 | 9.46984 | 8.9655 | 3.04 | 5.36 | 21 0 27.5 | 356 |
| 22 | 18 36 26.04 | 36 35.10 | 25 14 30.4 | 14 35.1 | 9.47019 | 9.1909 | 3.08 | 5.34 | 22 0 30.7 | 357 |
| 23 | 18 43 31.42 | 43 41.41 | 25 10 2.4 | 10 9.8 | 9.47040 | 9.3393 | 3.11 | 5.35 | 23 0 33.8 | 358 |
| 24 | 18 50 36.82 | 50 47.74 | 25 4 2.5 | 4 12.9 | 9.47028 | 9.4512 | 3.08 | 5.35 | 24 0 37.0 | 359 |
| 25 | 18 57 41.96 | 57 53.80 | 24 56 29.4 | 56 43.3 | 9.46982 | 9.5410 | 3.25 | 5.35 | 25 0 40.1 | 360 |
| 26 | 19 4 46.47 | 4 59.21 | 24 47 22.8 | 47 40.6 | 9.46913 | 9.6158 | 3.51 | 5.36 | 26 0 43.2 | 361 |
| 27 | 19 11 50.25 | 12 3.88 | 24 36 42.1 | 37 4.3 | 9.46807 | 9.6795 | 3.60 | 5.36 | 27 0 46.4 | 362 |
| 28 | 19 18 52.72 | 18 7.20 | 24 24 27.2 | 24 54.1 | 9.46653 | 9.7354 | 3.71 | 5.36 | 28 0 49.5 | 363 |
| 29 | 19 25 53.52 | 26 8.84 | 24 10 37.6 | 11 9.6 | 9.46457 | 9.7849 | 3.81 | 5.36 | 29 0 52.5 | 364 |
| 30 | 19 32 52.20 | 33 8.31 | 23 55 13.8 | 55 51.2 | 9.46210 | 9.8282 | 3.89 | 5.34 | 30 0 55.6 | 365 |
| 31 | 19 39 48.23 | 40 5.13 | 23 38 19.5 | 39 2.3 | 9.46006 | 9.8643 | 4.02 | 5.34 | 31 0 58.6 | 366 |
| 32 | 19 46 41.03 | 46 58.65 | −23 19 57.9 | 20 46.9 | +9.45713 | +9.9012 | +4.13 | +5.34 | 32 1 1.5 | 367 |

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Factor *t*. |  | Log. Factor *n*. |  | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |  |  |
| d | h. m. s. | m. s | ° ′ ″ | ′ ″ |  |  |  |  | d. h. m. | d. |
| Jan. 1 | 15 33 8.58 | 32 32.98 | −16 12 20.8 | 10 8.6 | +9.27491 | −9.8446 | +3.57 | +4.59 | 0 20 50.9 | 0 |
| 2 | 15 37 40.54 | 37 4.85 | 16 28 59.4 | 26 49.5 | 9.27739 | 9.8377 | 3.56 | 4.61 | 1 20 51.5 | 1 |
| 3 | 15 42 14.04 | 41 38.25 | 16 45 21.7 | 43 14.4 | 9.27983 | 9.8303 | 3.56 | 4.64 | 2 20 52.1 | 2 |
| 4 | 15 46 49.07 | 46 13.21 | 17 1 26.8 | 59 22.3 | 9.28222 | 9.8224 | 3.56 | 4.66 | 3 20 52.7 | 3 |
| 5 | 15 51 25.60 | 50 49.67 | 17 17 13.8 | 15 12.1 | 9.28456 | 9.8139 | 3.55 | 4.67 | 4 20 53.4 | 4 |
| 6 | 15 56 3.61 | 55 27.63 | 17 32 42.0 | 30 43.2 | 9.28687 | 9.8048 | 3.55 | 4.69 | 5 20 54.1 | 5 |
| 7 | 16 0 43.09 | 60 7.06 | 17 47 50.4 | 45 54.7 | 9.28912 | 9.7951 | 3.53 | 4.71 | 6 20 54.8 | 6 |
| 8 | 16 5 24.01 | 4 47.94 | 18 2 38.1 | 0 45.7 | 9.29133 | 9.7849 | 3.53 | 4.73 | 7 20 55.5 | 7 |
| 9 | 16 10 6.36 | 9 30.25 | 18 17 4.4 | 15 15.2 | 9.29351 | 9.7738 | 3.52 | 4.74 | 8 20 56.3 | 8 |
| 10 | 16 14 50.09 | 14 13.97 | 18 31 8.4 | 29 22.4 | 9.29562 | 9.7622 | 3.51 | 4.76 | 9 20 57.1 | 9 |
| 11 | 16 19 35.18 | 18 59.06 | 18 44 49.3 | 43 6.7 | 9.29766 | 9.7498 | 3.51 | 4.77 | 10 20 57.9 | 10 |
| 12 | 16 24 21.62 | 23 45.50 | 18 58 6.3 | 56 27.3 | 9.29973 | 9.7365 | 3.50 | 4.78 | 11 20 58.7 | 11 |
| 13 | 16 29 9.41 | 28 33.28 | 19 10 58.7 | 9 23.3 | 9.30172 | 9.7225 | 3.49 | 4.80 | 12 20 59.6 | 12 |
| 14 | 16 33 58.50 | 33 22.37 | 19 23 25.8 | 21 54.0 | 9.30365 | 9.7076 | 3.48 | 4.81 | 13 21 0.4 | 13 |
| 15 | 16 38 48.86 | 38 12.76 | 19 35 26.8 | 33 58.7 | 9.30552 | 9.6916 | 3.47 | 4.82 | 14 21 1.3 | 14 |
| 16 | 16 43 40.46 | 43 4.41 | 19 47 0.9 | 45 36.7 | 9.30736 | 9.6747 | 3.46 | 4.83 | 15 21 2.3 | 15 |
| 17 | 16 48 33.28 | 47 57.26 | 19 58 7.5 | 56 47.2 | 9.30914 | 9.6565 | 3.45 | 4.84 | 16 21 3.2 | 16 |
| 18 | 16 53 27.29 | 52 51.31 | 20 8 46.0 | 7 29.6 | 9.31089 | 9.6372 | 3.44 | 4.85 | 17 21 4.1 | 17 |
| 19 | 16 58 22.47 | 57 46.55 | 20 18 55.8 | 17 43.3 | 9.31260 | 9.6164 | 3.42 | 4.86 | 18 21 5.1 | 18 |
| 20 | 17 3 18.79 | 62 42.95 | 20 28 36.0 | 27 27.5 | 9.31422 | 9.5939 | 3.41 | 4.87 | 19 21 6.1 | 19 |
| 21 | 17 8 16.20 | 7 40.45 | 20 37 45.9 | 36 41.5 | 9.31579 | 9.5697 | 3.40 | 4.87 | 20 21 7.1 | 20 |
| 22 | 17 13 14.67 | 12 39.01 | 20 46 25.0 | 45 24.7 | 9.31732 | 9.5439 | 3.38 | 4.88 | 21 21 8.2 | 21 |
| 23 | 17 18 14.17 | 17 38.59 | 20 54 33.0 | 53 36.7 | 9.31878 | 9.5161 | 3.36 | 4.89 | 22 21 9.2 | 22 |
| 24 | 17 23 14.66 | 22 39.19 | 21 2 9.4 | 1 17.1 | 9.32019 | 9.4856 | 3.33 | 4.90 | 23 21 10.3 | 23 |
| 25 | 17 28 16.10 | 27 40.75 | 21 9 13.4 | 8 25.3 | 9.32153 | 9.4519 | 3.32 | 4.91 | 24 21 11.3 | 24 |
| 26 | 17 33 18.44 | 32 43.21 | 21 15 44.3 | 15 0.5 | 9.32275 | 9.4149 | 3.29 | 4.91 | 25 21 12.4 | 25 |
| 27 | 17 38 21.62 | 37 46.53 | 21 21 41.7 | 21 2.1 | 9.32398 | 9.3741 | 3.26 | 4.92 | 26 21 13.5 | 26 |
| 28 | 17 43 25.61 | 42 50.68 | 21 27 5.3 | 26 29.8 | 9.32509 | 9.3284 | 3.23 | 4.92 | 27 21 14.7 | 27 |
| 29 | 17 48 30.37 | 47 55.59 | 21 31 54.6 | 31 23.3 | 9.32610 | 9.2764 | 3.20 | 4.93 | 28 21 15.8 | 28 |
| 30 | 17 53 35.81 | 53 1.20 | 21 36 9.1 | 35 42.0 | 9.32707 | 9.2164 | 3.17 | 4.93 | 29 21 16.9 | 29 |
| 31 | 17 58 41.91 | 58 7.47 | 21 39 48.4 | 39 25.5 | 9.32795 | 9.1466 | 3.13 | 4.93 | 30 21 18.1 | 30 |
| Feb. 1 | 18 3 48.60 | 3 14.34 | 21 42 52.3 | 42 33.5 | 9.32878 | 9.0623 | 3.07 | 4.94 | 31 21 19.3 | 31 |
| 2 | 18 8 55.84 | 8 21.78 | 21 45 20.4 | 45 5.7 | 9.32951 | 8.9559 | 3.01 | 4.94 | 32 21 20.5 | 32 |
| 3 | 18 14 3.56 | 13 29.71 | 21 47 12.3 | 47 1.8 | 9.33011 | 8.8136 | 2.94 | 4.94 | 33 21 21.7 | 33 |
| 4 | 18 19 11.69 | 18 38.05 | 21 48 27.8 | 48 21.4 | 9.33067 | 8.6006 | 2.90 | 4.95 | 34 21 22.8 | 34 |
| 5 | 18 24 20.19 | 23 46.75 | 21 49 6.8 | 49 4.3 | 9.33115 | −8.1576 | 2.41 | 4.95 | 35 21 24.0 | 35 |
| 6 | 18 29 29.00 | 28 55.79 | 21 49 9.0 | 49 10.5 | 9.33157 | +8.0525 | 2.70 | 4.95 | 36 21 25.2 | 36 |
| 7 | 18 34 38.07 | 34 5.09 | 21 48 34.2 | 48 39.7 | 9.33187 | 8.5688 | 2.53 | 4.95 | 37 21 26.4 | 37 |
| 8 | 18 39 47.33 | 39 14.60 | 21 47 22.3 | 47 31.7 | 9.33210 | 8.7978 | 2.38 | 4.95 | 38 21 27.7 | 38 |
| 9 | 18 44 56.74 | 44 24.26 | 21 45 33.3 | 45 46.5 | 9.33226 | 8.9472 | +2.16 | 4.95 | 39 21 28.9 | 39 |
| 10 | 18 50 6.23 | 49 34.00 | 21 43 7.1 | 43 24.1 | 9.33236 | 9.0591 | −1.68 | 4.95 | 40 21 30.1 | 40 |
| 11 | 18 55 15.75 | 54 43.79 | 21 40 3.5 | 40 24.2 | 9.33236 | 9.1474 | 2.29 | 4.95 | 41 21 31.3 | 41 |
| 12 | 19 0 25.24 | 59 53.55 | 21 36 22.7 | 36 47.0 | 9.33227 | 9.2208 | 2.38 | 4.95 | 42 21 32.5 | 42 |
| 13 | 19 5 34.66 | 5 3.24 | 21 32 4.7 | 32 32.6 | 9.33213 | 9.2837 | 2.59 | 4.95 | 43 21 33.7 | 43 |
| 14 | 19 10 43.95 | 10 12.81 | 21 27 9.5 | 27 40.9 | 9.33190 | 9.3382 | 2.70 | 4.95 | 44 21 35.0 | 44 |
| 15 | 19 15 53.06 | 15 22.20 | 21 21 37.3 | 22 12.1 | 9.33164 | 9.3866 | 2.80 | 4.95 | 45 21 36.2 | 45 |
| 16 | 19 21 1.96 | 20 31.38 | 21 15 28.1 | 16 6.3 | 9.33129 | 9.4301 | 2.85 | 4.95 | 46 21 37.4 | 46 |
| 17 | 19 26 10.59 | 25 40.30 | 21 8 42.0 | 9 23.5 | 9.33090 | 9.4697 | 2.91 | 4.94 | 47 21 38.6 | 47 |
| 18 | 19 31 18.92 | 30 48.91 | 21 1 19.1 | 2 3.8 | 9.33047 | 9.5055 | 2.97 | 4.94 | 48 21 39.8 | 48 |
| 19 | 19 36 26.91 | 35 57.19 | 20 53 19.8 | 54 7.6 | 9.32992 | 9.5384 | 3.03 | 4.94 | 49 21 41.0 | 49 |
| 20 | 19 41 34.49 | 41 5.07 | 20 44 44.2 | 45 35.1 | 9.32930 | 9.5691 | 3.05 | 4.94 | 50 21 42.2 | 50 |
| 21 | 19 46 41.62 | 46 12.49 | 20 35 32.4 | 36 26.4 | 9.32864 | 9.5975 | 3.09 | 4.93 | 51 21 43.2 | 51 |
| 22 | 19 51 48.27 | 51 19.42 | 20 25 44.7 | 26 41.6 | 9.32794 | 9.6239 | 3.11 | 4.93 | 52 21 44.4 | 52 |
| 23 | 19 56 54.41 | 56 25.86 | 20 15 21.5 | 16 21.1 | 9.32721 | 9.6486 | 3.15 | 4.93 | 53 21 45.6 | 53 |
| 24 | 20 2 0.01 | 1 31.77 | 20 4 23.2 | 5 25.4 | 9.32640 | 9.6717 | 3.18 | 4.92 | 54 21 46.8 | 54 |
| 25 | 20 7 5.02 | 6 37.09 | 19 52 49.8 | 53 54.8 | 9.32553 | 9.6934 | 3.21 | 4.92 | 55 21 48.0 | 55 |
| 26 | 20 12 9.40 | 11 41.76 | 19 40 41.9 | 41 49.5 | 9.32459 | 9.7139 | 3.22 | 4.91 | 56 21 49.1 | 56 |
| 27 | 20 17 13.11 | 16 45.76 | 19 27 59.9 | 29 10.0 | 9.32363 | 9.7333 | 3.23 | 4.91 | 57 21 50.2 | 57 |
| 28 | 20 22 16.14 | 21 49.08 | 19 14 44.1 | 15 56.6 | 9.32262 | 9.7515 | 3.26 | 4.90 | 58 21 51.3 | 58 |
| 29 | 20 27 18.44 | 26 51.68 | 19 0 55.0 | 2 9.8 | 9.32157 | 9.7689 | 3.27 | 4.90 | 59 21 52.4 | 59 |
| Mar. 1 | 20 32 19.99 | 31 53.53 | 18 46 32.9 | 47 49.9 | 9.32045 | 9.7855 | 3.27 | 4.89 | 60 21 53.5 | 60 |
| 2 | 20 37 20.74 | 36 54.59 | −18 31 38.2 | 32 57.4 | +9.31927 | +9.8011 | −3.31 | +4.88 | 61 21 54.6 | 61 |

NOTE.—The Transits precede the Noon opposite which they are given.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination | | Log. Factor $t$. | | Log. Factor $t^2$. | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d | h. m s. | m. s | ° ′ ″ | ′ ″ | | | | | d. h. m. | d. |
| Mar. 1 | 20 32 19.99 | 31 53.58 | −18 46 32.9 | 47 49.9 | +9.32045 | +9.7855 | −3.27 | +4.89 | 60 21 53.5 | 60 |
| 2 | 20 37 20.74 | 36 54.59 | 18 31 38.2 | 32 57.4 | 9.31927 | 9.8011 | 3.31 | 4.88 | 61 21 54.6 | 61 |
| 3 | 20 42 20.69 | 41 54.82 | 18 16 11.6 | 17 32.9 | 9.31808 | 9.8160 | 3.31 | 4.87 | 62 21 55.6 | 62 |
| 4 | 20 47 19.81 | 46 54.22 | 18 0 13.6 | 1 36.9 | 9.31688 | 9.8300 | 3.32 | 4.87 | 63 21 56.7 | 63 |
| 5 | 20 52 18.08 | 51 52.77 | 17 43 44.9 | 45 10.0 | 9.31565 | 9.8435 | 3.34 | 4.86 | 64 21 57.7 | 64 |
| 6 | 20 57 15.48 | 56 50.46 | 17 26 45.8 | 28 12.8 | 9.31435 | 9.8563 | 3.34 | 4.85 | 65 21 58.7 | 65 |
| 7 | 21 2 11.98 | 1 47.26 | 17 9 16.8 | 10 45.7 | 9.31302 | 9.8684 | 3.34 | 4.84 | 66 21 59.7 | 66 |
| 8 | 21 7 7.58 | 6 43.14 | 16 51 18.7 | 52 49.2 | 9.31167 | 9.8802 | 3.34 | 4.83 | 67 22 0.7 | 67 |
| 9 | 21 12 2.27 | 11 38.10 | 16 32 51.9 | 34 23.9 | 9.31032 | 9.8912 | 3.36 | 4.82 | 68 22 1.7 | 68 |
| 10 | 21 16 56.03 | 16 32.13 | 16 13 57.2 | 15 30.6 | 9.30895 | 9.9019 | 3.36 | 4.81 | 69 22 2.6 | 69 |
| 11 | 21 21 48.86 | 21 25.21 | 15 54 35.0 | 56 10.0 | 9.30755 | 9.9120 | 3.36 | 4.80 | 70 22 3.5 | 70 |
| 12 | 21 26 40.74 | 26 17.35 | 15 34 46.0 | 36 22.5 | 9.30615 | 9.9217 | 3.35 | 4.79 | 71 22 4.4 | 71 |
| 13 | 21 31 31.69 | 31 8.56 | 15 14 30.8 | 16 8.6 | 9.30476 | 9.9309 | 3.35 | 4.78 | 72 22 5.4 | 72 |
| 14 | 21 36 21.71 | 35 58.84 | 14 53 50.1 | 55 29.0 | 9.30338 | 9.9398 | 3.35 | 4.77 | 73 22 6.3 | 73 |
| 15 | 21 41 10.81 | 40 48.19 | 14 32 44.4 | 34 24.5 | 9.30198 | 9.9482 | 3.35 | 4.76 | 74 22 7.2 | 74 |
| 16 | 21 45 58.98 | 45 36.61 | 14 11 14.3 | 12 55.6 | 9.30060 | 9.9564 | 3.34 | 4.75 | 75 22 8.0 | 75 |
| 17 | 21 50 46.24 | 50 24.11 | 13 49 20.5 | 51 2.9 | 9.29922 | 9.9644 | 3.34 | 4.73 | 76 22 8.9 | 76 |
| 18 | 21 55 32.59 | 55 10.69 | 18 27 3.7 | 28 47.0 | 9.29784 | 9.9714 | 3.34 | 4.72 | 77 22 9.7 | 77 |
| 19 | 22 0 18.04 | 59 56.37 | 13 4 24.6 | 6 8.7 | 9.29647 | 9.9785 | 3.32 | 4.71 | 78 22 10.5 | 78 |
| 20 | 22 5 2.61 | 4 41.16 | 12 41 23.7 | 43 8.7 | 9.29515 | 9.9852 | 3.30 | 4.70 | 79 22 11.3 | 79 |
| 21 | 22 9 46.32 | 9 25.09 | 12 18 1.7 | 19 47.5 | 9.29387 | 9.9916 | 3.30 | 4.68 | 80 22 12.1 | 80 |
| 22 | 22 14 29.20 | 14 8.19 | 11 54 19.3 | 56 5.8 | 9.29260 | 9.9978 | 3.30 | 4.67 | 81 22 12.9 | 81 |
| 23 | 22 19 11.26 | 18 50.47 | 11 30 17.0 | 32 4.2 | 9.29133 | 0.0037 | 3.29 | 4.65 | 82 22 13.7 | 82 |
| 24 | 22 23 52.51 | 23 31.92 | 11 5 55.4 | 7 43.3 | 9.29010 | 0.0093 | 3.26 | 4.64 | 83 22 14.4 | 83 |
| 25 | 22 28 32.96 | 28 12.56 | 10 41 15.3 | 43 3.7 | 9.28886 | 0.0146 | 3.25 | 4.62 | 84 22 15.1 | 84 |
| 26 | 22 33 12.63 | 32 52.43 | 10 16 17.4 | 18 6.3 | 9.28766 | 0.0198 | 3.25 | 4.60 | 85 22 15.9 | 85 |
| 27 | 22 37 51.55 | 37 31.55 | 9 51 2.3 | 52 51.7 | 9.28652 | 0.0246 | 3.22 | 4.58 | 86 22 16.6 | 86 |
| 28 | 22 42 29.74 | 42 9.92 | 9 25 30.7 | 27 20.5 | 9.28544 | 0.0291 | 3.21 | 4.56 | 87 22 17.3 | 87 |
| 29 | 22 47 7.25 | 46 47.59 | 8 59 43.4 | 61 33.6 | 9.28438 | 0.0334 | 3.21 | 4.55 | 88 22 17.9 | 88 |
| 30 | 22 51 44.08 | 51 24.60 | 8 33 41.1 | 35 31.6 | 9.28332 | 0.0375 | 3.19 | 4.53 | 89 22 18.6 | 89 |
| 31 | 22 56 20.25 | 56 0.96 | 8 7 24.2 | 9 15.0 | 9.28230 | 0.0415 | 3.16 | 4.50 | 90 22 19.3 | 90 |
| Apr. 1 | 23 0 55.78 | 0 36.67 | 7 40 53.5 | 42 44.5 | 9.28131 | 0.0451 | 3.14 | 4.48 | 91 22 19.9 | 91 |
| 2 | 23 5 30.71 | 5 11.75 | 7 14 9.9 | 16 1.0 | 9.28039 | 0.0485 | 3.14 | 4.45 | 92 22 20.6 | 92 |
| 3 | 23 10 5.07 | 9 46.26 | 6 47 13.9 | 49 5.2 | 9.27950 | 0.0517 | 3.11 | 4.42 | 93 22 21.2 | 93 |
| 4 | 23 14 38.88 | 14 20.22 | 6 20 6.4 | 21 57.8 | 9.27864 | 0.0547 | 3.07 | 4.40 | 94 22 21.8 | 94 |
| 5 | 23 19 12.16 | 18 53.65 | 5 52 48.0 | 54 39.4 | 9.27785 | 0.0575 | 3.05 | 4.37 | 95 22 22.4 | 95 |
| 6 | 23 23 44.96 | 23 26.60 | 5 25 19.4 | 27 10.8 | 9.27709 | 0.0601 | 3.03 | 4.34 | 96 22 23.0 | 96 |
| 7 | 23 28 17.30 | 27 59.08 | 4 57 41.2 | 59 32.6 | 9.27638 | 0.0625 | 3.00 | 4.30 | 97 22 23.6 | 97 |
| 8 | 23 32 49.21 | 32 31.13 | 4 29 54.2 | 31 45.4 | 9.27571 | 0.0648 | 2.95 | 4.26 | 98 22 24.2 | 98 |
| 9 | 23 37 20.72 | 37 2.78 | 4 1 59.0 | 3 50.0 | 9.27511 | 0.0667 | 2.89 | 4.22 | 99 22 24.8 | 99 |
| 10 | 23 41 51.87 | 41 34.06 | 3 33 56.5 | 35 47.2 | 9.27458 | 0.0686 | 2.87 | 4.17 | 100 22 25.4 | 100 |
| 11 | 23 46 22.70 | 46 5.02 | 3 5 47.2 | 7 37.7 | 9.27406 | 0.0702 | 2.81 | 4.11 | 101 22 26.0 | 101 |
| 12 | 23 50 53.23 | 50 35.67 | 2 37 31.9 | 39 22.2 | 9.27359 | 0.0717 | 2.72 | 4.08 | 102 22 26.5 | 102 |
| 13 | 23 55 23.49 | 55 6.06 | 2 9 11.1 | 11 1.1 | 9.27321 | 0.0730 | 2.61 | 4.01 | 103 22 27.1 | 103 |
| 14 | 23 59 53.55 | 59 36.23 | 1 40 45.6 | 42 35.2 | 9.27292 | 0.0741 | 2.56 | 3.91 | 104 22 27.6 | 104 |
| 15 | 0 4 23.45 | 4 6.24 | 1 12 16.0 | 14 5.1 | 9.27269 | 0.0750 | 2.38 | 3.84 | 105 22 28.2 | 106 |
| 16 | 0 8 53.21 | 8 36.12 | 0 43 43.0 | 45 31.6 | 9.27250 | 0.0758 | 2.23 | 3.72 | 106 22 28.8 | 107 |
| 17 | 0 13 22.86 | 13 5.90 | − 0 15 7.3 | 16 55.4 | 9.27238 | 0.0764 | 1.68 | 3.53 | 107 22 29.3 | 108 |
| 18 | 0 17 52.46 | 17 35.60 | + 0 13 30.5 | 11 43.0 | 9.27231 | 0.0769 | −1.38 | 3.34 | 108 22 29.9 | 109 |
| 19 | 0 22 22.04 | 22 5.27 | 0 42 9.7 | 40 22.8 | 9.27228 | 0.0771 | +1.98 | +2.68 | 109 22 30.4 | 110 |
| 20 | 0 26 51.62 | 26 34.95 | 1 10 49.6 | 9 3.3 | 9.27233 | 0.0772 | 2.34 | −2.98 | 110 22 31.0 | 111 |
| 21 | 0 31 21.25 | 31 4.68 | 1 39 29.5 | 37 43.8 | 9.27246 | 0.0772 | 2.53 | 3.42 | 111 22 31.5 | 112 |
| 22 | 0 35 50.98 | 35 34.51 | 2 8 8.9 | 6 23.8 | 9.27269 | 0.0769 | 2.64 | 3.64 | 112 22 32.1 | 113 |
| 23 | 0 40 20.87 | 40 4.49 | 2 36 47.1 | 35 2.8 | 9.27296 | 0.0765 | 2.68 | 3.78 | 113 22 32.6 | 114 |
| 24 | 0 44 50.96 | 44 34.67 | 3 5 23.3 | 3 39.9 | 9.27329 | 0.0760 | 2.76 | 3.86 | 114 22 33.2 | 115 |
| 25 | 0 49 21.26 | 49 5.07 | 3 33 56.9 | 32 14.4 | 9.27366 | 0.0753 | 2.83 | 3.96 | 115 22 33.8 | 116 |
| 26 | 0 53 51.81 | 53 35.71 | 4 2 27.3 | 0 45.6 | 9.27408 | 0.0743 | 2.87 | 4.04 | 116 22 34.3 | 117 |
| 27 | 0 58 22.64 | 58 6.63 | 4 30 53.7 | 29 12.9 | 9.27456 | 0.0732 | 2.94 | 4.10 | 117 22 34.9 | 118 |
| 28 | 1 2 53.79 | 2 37.87 | 4 59 15.3 | 57 35.5 | 9.27512 | 0.0719 | 2.98 | 4.16 | 118 22 35.5 | 119 |
| 29 | 1 7 25.31 | 7 9.47 | 5 27 31.4 | 25 52.6 | 9.27576 | 0.0704 | 3.03 | 4.19 | 119 22 36.0 | 120 |
| 30 | 1 11 57.24 | 11 41.48 | 5 55 41.5 | 54 3.8 | 9.27643 | 0.0688 | 3.05 | 4.25 | 120 22 36.6 | 121 |
| 31 | 1 16 29.60 | 16 13.93 | + 6 23 44.9 | 22 8.3 | +9.27717 | +0.0669 | +3.09 | −4.29 | 121 22 37.2 | 122 |

**Note** — The Transits precede the Noon opposite which they are given.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination. | | Log. Factor *t*. | | Log. Factor $\rho^2$ | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d. | h. m. s. | m. s. | ° ′ ″ | ″ | | | | | d. h. m. | d. |
| May 1 | 1 16 29.60 | 16 13.93 | + 6 23 44.9 | 22 8.3 | +9.27717 | +0.0669 | +3.09 | −4.29 | 121 22 37.2 | 122 |
| 2 | 1 21 02.45 | 20 46.86 | 6 51 40.7 | 50 5.3 | 9.27796 | 0.0649 | 3.09 | 4.32 | 122 22 37.8 | 123 |
| 3 | 1 25 35.81 | 25 20.31 | 7 19 28.2 | 17 54.1 | 9.27876 | 0.0626 | 3.12 | 4.36 | 123 22 38.4 | 124 |
| 4 | 1 30 9.69 | 29 54.29 | 7 47 6.7 | 45 33.9 | 9.27961 | 0.0602 | 3.17 | 4.40 | 124 22 39.1 | 125 |
| 5 | 1 34 44.13 | 34 28.81 | 8 14 35.6 | 13 4.0 | 9.28052 | 0.0576 | 3.19 | 4.42 | 125 22 39.7 | 126 |
| 6 | 1 39 19.17 | 39 3.93 | 8 41 54.2 | 40 23.8 | 9.28153 | 0.0547 | 3.20 | 4.45 | 126 22 40.3 | 127 |
| 7 | 1 43 54.87 | 43 39.71 | 9 9 1.6 | 7 32.6 | 9.28259 | 0.0516 | 3.22 | 4.48 | 127 22 41.0 | 128 |
| 8 | 1 48 31.23 | 48 16.17 | 9 35 57.1 | 34 29.6 | 9.28366 | 0.0483 | 3.25 | 4.50 | 128 22 41.7 | 129 |
| 9 | 1 53 8.27 | 52 53.33 | 10 2 40.0 | 1 14.0 | 9.28476 | 0.0448 | 3.27 | 4.52 | 129 22 42.3 | 130 |
| 10 | 1 57 46.05 | 57 31.20 | 10 29 9.7 | 27 45.1 | 9.28591 | 0.0412 | 3.28 | 4.54 | 130 22 43.0 | 131 |
| 11 | 2 2 24.60 | 2 9.82 | 10 55 25.5 | 54 2.4 | 9.28715 | 0.0372 | 3.30 | 4.56 | 131 22 43.7 | 132 |
| 12 | 2 7 3.96 | 6 49.25 | 11 21 26.7 | 20 5.1 | 9.28843 | 0.0330 | 3.30 | 4.59 | 132 22 44.4 | 133 |
| 13 | 2 11 44.14 | 11 29.53 | 11 47 12.5 | 45 52.5 | 9.28973 | 0.0286 | 3.30 | 4.60 | 133 22 45.1 | 134 |
| 14 | 2 16 25.15 | 16 10.67 | 12 12 42.2 | 11 23.9 | 9.29103 | 0.0239 | 3.34 | 4.62 | 134 22 45.9 | 135 |
| 15 | 2 21 7.04 | 20 52.68 | 12 37 55.1 | 36 38.5 | 9.29241 | 0.0190 | 3.35 | 4.64 | 135 22 46.7 | 136 |
| 16 | 2 25 49.85 | 25 35.58 | 13 2 50.5 | 1 35.6 | 9.29383 | 0.0139 | 3.37 | 4.66 | 136 22 47.4 | 137 |
| 17 | 2 30 33.59 | 30 19.42 | 13 27 27.7 | 26 14.5 | 9.29528 | 0.0084 | 3.37 | 4.67 | 137 22 48.2 | 138 |
| 18 | 2 35 18.29 | 35 4.24 | 13 51 46.0 | 50 34.5 | 9.29677 | 0.0027 | 3.38 | 4.68 | 138 22 49.0 | 139 |
| 19 | 2 40 3.98 | 39 50.04 | 14 15 44.7 | 14 35.0 | 9.29828 | 9.9966 | 3.39 | 4.70 | 139 22 49.8 | 140 |
| 20 | 2 44 50.67 | 44 36.85 | 14 39 23.0 | 38 15.3 | 9.29982 | 9.9903 | 3.43 | 4.71 | 140 22 50.7 | 141 |
| 21 | 2 49 38.39 | 49 24.69 | 15 2 40.4 | 1 34.5 | 9.30141 | 9.9837 | 3.44 | 4.73 | 141 22 51.5 | 142 |
| 22 | 2 54 27.17 | 54 13.59 | 15 25 36.1 | 24 32.0 | 9.30300 | 9.9767 | 3.41 | 4.75 | 142 22 52.4 | 143 |
| 23 | 2 59 17.02 | 59 3.57 | 15 48 9.3 | 47 7.1 | 9.30462 | 9.9693 | 3.42 | 4.76 | 143 22 53.3 | 144 |
| 24 | 3 4 7.96 | 3 54.64 | 16 10 19.2 | 9 18.9 | 9.30625 | 9.9617 | 3.40 | 4.77 | 144 22 54.2 | 145 |
| 25 | 3 9 0.00 | 8 46.81 | 16 32 5.3 | 31 6.9 | 9.30788 | 9.9536 | 3.42 | 4.78 | 145 22 55.1 | 146 |
| 26 | 3 13 53.13 | 13 40.08 | 16 53 26.9 | 52 30.4 | 9.30953 | 9.9453 | 3.43 | 4.79 | 146 22 56.0 | 147 |
| 27 | 3 18 47.38 | 18 34.48 | 17 14 23.3 | 13 28.8 | 9.31120 | 9.9364 | 3.44 | 4.81 | 147 22 57.0 | 148 |
| 28 | 3 23 42.76 | 23 30.02 | 17 34 53.8 | 34 1.3 | 9 31286 | 9.9271 | 3.43 | 4.82 | 148 22 58.0 | 149 |
| 29 | 3 28 39.27 | 28 26.69 | 17 54 57.5 | 54 7.0 | 9.31450 | 9.9172 | 3.43 | 4.83 | 149 22 59.0 | 150 |
| 30 | 3 33 36.90 | 33 24.48 | 18 14 33.5 | 13 45.1 | 9.31615 | 9.9069 | 3.44 | 4.84 | 150 23 0.0 | 151 |
| 31 | 3 38 35.66 | 38 23.41 | 18 33 41.2 | 32 54.8 | 9.31779 | 9.8962 | 3.44 | 4.85 | 151 23 1.0 | 152 |
| June 1 | 3 43 35.55 | 43 23.47 | 18 52 20.2 | 51 35.7 | 9.31943 | 9.8849 | 3.43 | 4.86 | 152 23 2.1 | 153 |
| 2 | 3 48 36.57 | 48 24.67 | 19 10 29.8 | 9 47.3 | 9.32106 | 9.8730 | 3.42 | 4.87 | 153 23 3.2 | 154 |
| 3 | 3 53 38.71 | 53 27.00 | 19 28 9.1 | 27 28.7 | 9.32265 | 9.8604 | 3.42 | 4.88 | 154 23 4.3 | 155 |
| 4 | 3 58 41.95 | 58 30.43 | 19 45 17.5 | 44 39.1 | 9.32421 | 9.8472 | 3.42 | 4.89 | 155 23 5.4 | 156 |
| 5 | 4 3 46.28 | 3 34.96 | 20 1 54.4 | 1 17.9 | 9.32577 | 9.8334 | 3.40 | 4.90 | 156 23 6.5 | 157 |
| 6 | 4 8 51.69 | 8 40.57 | 20 17 59.2 | 17 24.6 | 9.32729 | 9.8189 | 3.39 | 4.91 | 157 23 7.7 | 158 |
| 7 | 4 13 58.15 | 13 47.23 | 20 33 31.1 | 32 58.5 | 9.32875 | 9.8033 | 3.40 | 4.91 | 158 23 8.8 | 159 |
| 8 | 4 19 5.64 | 18 54.94 | 20 48 29.5 | 47 58.9 | 9.33020 | 9.7869 | 3.39 | 4.92 | 159 23 10.0 | 160 |
| 9 | 4 24 14.15 | 24 3.68 | 21 2 53.9 | 2 25.2 | 9.33164 | 9.7697 | 3.37 | 4.93 | 160 23 11.2 | 161 |
| 10 | 4 29 23.67 | 29 13.42 | 21 16 43.6 | 16 16.8 | 9.33303 | 9.7514 | 3.36 | 4.93 | 161 23 12.4 | 162 |
| 11 | 4 34 34.17 | 34 24.15 | 21 29 58.1 | 29 33.1 | 9.33436 | 9.7320 | 3.35 | 4.94 | 162 23 13.6 | 163 |
| 12 | 4 39 45.60 | 39 35.83 | 21 42 36.9 | 42 13.7 | 9.33566 | 9.7114 | 3.34 | 4.95 | 163 23 14.9 | 164 |
| 13 | 4 44 57.95 | 44 48.43 | 21 54 39.5 | 54 18.0 | 9.33693 | 9.6895 | 3.35 | 4.95 | 164 23 16.2 | 165 |
| 14 | 4 50 11.20 | 50 1.94 | 22 6 5.4 | 5 45.6 | 9.33815 | 9.6661 | 3.30 | 4.96 | 165 23 17.5 | 166 |
| 15 | 4 55 25.31 | 55 16.31 | 22 16 54.0 | 16 35.9 | 9.33932 | 9.6411 | 3.28 | 4.96 | 166 23 18.8 | 167 |
| 16 | 5 0 40.24 | 0 31.51 | 22 27 4.8 | 26 48.4 | 9.34043 | 9.6140 | 3.26 | 4.97 | 167 23 20.1 | 168 |
| 17 | 5 5 55.96 | 5 47.49 | 22 36 37.4 | 36 22.6 | 9.34147 | 9.5847 | 3 23 | 4.97 | 168 23 21.4 | 169 |
| 18 | 5 11 12.42 | 11 4.21 | 22 45 31.3 | 45 18.0 | 9.34248 | 9.5531 | 3.22 | 4.98 | 169 23 22.7 | 170 |
| 19 | 5 16 29.60 | 16 21.66 | 22 53 46.2 | 53 34.3 | 9.34343 | 9.5187 | 3.22 | 4.98 | 170 23 24.0 | 171 |
| 20 | 5 21 47.45 | 21 39.80 | 23 1 21.8 | 1 11.3 | 9.34434 | 9.4809 | 3.15 | 4.99 | 171 23 25.4 | 172 |
| 21 | 5 27 5.94 | 26 58.58 | 23 8 17.6 | 8 8.5 | 9.34518 | 9.4392 | 3.10 | 4.99 | 172 23 26.8 | 173 |
| 22 | 5 32 25.01 | 32 17.94 | 23 14 33.2 | 14 25.4 | 9.34592 | 9.3925 | 3.05 | 4.99 | 173 23 28.1 | 174 |
| 23 | 5 37 44.59 | 37 37.82 | 23 20 8.3 | 20 1.7 | 9.34655 | 9.3396 | 3.02 | 4.99 | 174 23 29.5 | 175 |
| 24 | 5 43 4.62 | 42 58.15 | 23 25 2.6 | 24 57.1 | 9.34714 | 9.2795 | 2.98 | 5.00 | 175 23 30.9 | 176 |
| 25 | 5 48 25.07 | 48 18.90 | 23 29 16.0 | 29 11.5 | 9.34770 | 9.2087 | 2.91 | 5.00 | 176 23 32.3 | 177 |
| 26 | 5 53 45.92 | 53 40.05 | 23 32 48.1 | 32 44.6 | 9.34821 | 9.1236 | 2.81 | 5.00 | 177 23 33.7 | 178 |
| 27 | 5 59 7.10 | 59 1.54 | 23 35 38.7 | 35 36.1 | 9.34860 | 9.0176 | 2.74 | 5.00 | 178 23 35.1 | 179 |
| 28 | 6 4 28.55 | 4 23.30 | 23 37 47.7 | 37 45.9 | 9.34893 | 8.8751 | 2.59 | 5.00 | 179 23 36.5 | 180 |
| 29 | 6 9 50.20 | 9 45.28 | 23 39 14.8 | 39 13.8 | 9.34917 | 8.6628 | 2.33 | 5.00 | 180 23 38.0 | 181 |
| 30 | 6 15 12.00 | 15 7.40 | 23 40 0.1 | 39 59.8 | 9.34932 | +8.2290 | 1.68 | 5.00 | 181 23 39.4 | 182 |
| 31 | 6 20 33.88 | 20 29.59 | +23 40 3.5 | 40 3.7 | +9.34938 | −8.0822 | +1.68 | −5.00 | 182 23 40.8 | 183 |

NOTE.—The Transits precede the Noon opposite which they are given.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Factor $t$. |  | Log. Factor $t^2$. |  | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |  |  |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  | d. h. m. | d. |
| July 1 | 6 20 33.88 | 20 29.59 | +23 40 3.5 | 40 3.7 | +9.34938 | −8.0822 | +1.68 | −5.00 | 182 23 40.8 | 183 |
| 2 | 6 25 55.78 | 25 51.80 | 23 39 24.9 | 39 25.6 | 9.34939 | 8.6191 | −2.28 | 5.01 | 183 23 42.2 | 184 |
| 3 | 6 31 17.66 | 31 13.99 | 23 38 4.0 | 38 5.2 | 9.34931 | 8.8511 | 2.56 | 5.01 | 184 23 43.6 | 185 |
| 4 | 6 36 39.45 | 36 36.11 | 23 36 0.9 | 36 2.4 | 9.34913 | 9.0012 | 2.70 | 5.00 | 185 23 45.1 | 186 |
| 5 | 6 42 1.07 | 41 58.06 | 23 33 15.6 | 33 17.4 | 9.34886 | 9.1114 | 2.80 | 5.00 | 186 23 46.5 | 187 |
| 6 | 6 47 22.46 | 47 19.77 | 23 29 48.5 | 29 50.4 | 9.34851 | 9.1996 | 2.89 | 5.00 | 187 23 47.9 | 188 |
| 7 | 6 52 43.57 | 52 41.20 | 23 25 39.7 | 25 41.7 | 9.34809 | 9.2724 | 2.94 | 5.00 | 188 23 49.4 | 189 |
| 8 | 6 58 4.35 | 58 2.30 | 23 20 49.3 | 20 51.3 | 9.34763 | 9.3348 | 3.01 | 5.00 | 189 23 50.8 | 190 |
| 9 | 7 3 24.76 | 63 23.03 | 23 15 17.3 | 15 19.2 | 9.34710 | 9.3893 | 3.05 | 5.00 | 190 23 52.2 | 191 |
| 10 | 7 8 44.75 | 8 43.32 | 23 9 3.8 | 9 5.6 | 9.34649 | 9.4375 | 3.11 | 4.99 | 191 23 53.5 | 192 |
| 11 | 7 14 4.26 | 14 3.13 | 23 2 9.1 | 2 10.6 | 9.34580 | 9.4804 | 3.15 | 4.99 | 192 23 54.9 | 193 |
| 12 | 7 19 23.23 | 19 22.41 | 22 54 33.6 | 54 34.8 | 9.34501 | 9.5192 | 3.18 | 4.99 | 193 23 56 3 | 194 |
| 13 | 7 24 41.60 | 24 41.09 | 22 46 17.6 | 46 18.4 | 9.34415 | 9.5545 | 3.20 | 4.99 | 194 23 57.7 | 195 |
| 14 | 7 29 59.33 | 29 59.12 | 22 37 21.4 | 37 21.8 | 9.34326 | 9.5868 | 3.23 | 4.98 | 195 23 59.0 | 196 |
| 15 | 7 35 16.39 | 35 16.46 | 22 27 45.2 | 27 45.2 | 9.34232 | 9.6170 | 3.25 | 4.98 | 197 0 0.3 | 197 |
| 16 | 7 40 32.74 | 40 33.10 | 22 17 29.4 | 17 28.7 | 9.34133 | 9.6449 | 3.27 | 4.98 | 198 0 1.7 | 198 |
| 17 | 7 45 48.34 | 45 49.00 | 22 6 34.3 | 6 32.9 | 9.34024 | 9.6709 | 3.31 | 4.97 | 199 0 3.0 | 199 |
| 18 | 7 51 3.13 | 51 4.08 | 21 55 0.3 | 54 58.2 | 9.33909 | 9.6949 | 3.32 | 4.97 | 200 0 4.3 | 200 |
| 19 | 7 56 17.07 | 56 18.29 | 21 42 48.0 | 42 45.1 | 9.33789 | 9.7175 | 3.33 | 4.96 | 201 0 5.6 | 201 |
| 20 | 8 1 30.13 | 1 31.62 | 21 29 57.8 | 29 54.1 | 9.33666 | 9.7388 | 3.35 | 4.96 | 202 0 6.8 | 202 |
| 21 | 8 6 42.29 | 6 44.05 | 21 16 30.1 | 16 25.5 | 9.33540 | 9.7589 | 3.36 | 4.95 | 203 0 8.1 | 203 |
| 22 | 8 11 53.53 | 11 55.54 | 21 2 25.3 | 2 19.7 | 9.33408 | 9.7778 | 3.37 | 4.94 | 204 0 9.3 | 204 |
| 23 | 8 17 3.81 | 17 6.09 | 20 47 44.0 | 47 37.4 | 9.33272 | 9.7957 | 3.38 | 4.93 | 205 0 10.6 | 205 |
| 24 | 8 22 13.11 | 22 15.65 | 20 32 26.7 | 32 19.0 | 9.33132 | 9.8125 | 3.39 | 4.93 | 206 0 11.8 | 206 |
| 25 | 8 27 21.40 | 27 24.18 | 20 16 34.0 | 16 25.2 | 9.32988 | 9.8285 | 3.40 | 4.92 | 207 0 13.0 | 207 |
| 26 | 8 32 28.66 | 32 31.67 | 19 60 6.3 | 59 56.5 | 9.32841 | 9.8438 | 3.41 | 4.91 | 208 0 14.1 | 208 |
| 27 | 8 37 34.87 | 37 38.12 | 19 43 4.2 | 42 53.2 | 9.32691 | 9.8584 | 3.42 | 4.90 | 209 0 15.3 | 209 |
| 28 | 8 42 40.01 | 42 43.49 | 19 25 28.4 | 25 16.1 | 9 32537 | 9.8721 | 3.42 | 4.90 | 210 0 16.4 | 210 |
| 29 | 8 47 44.06 | 47 47.78 | 19 7 19.5 | 7 6.0 | 9.32381 | 9.8852 | 3.44 | 4.89 | 211 0 17.6 | 211 |
| 30 | 8 52 47.01 | 52 50.95 | 18 48 38.2 | 48 23.5 | 9.32223 | 9.8976 | 3.44 | 4.88 | 212 0 18.7 | 212 |
| 31 | 8 57 48.84 | 57 52.99 | 18 29 25.2 | 29 9.2 | 9.32060 | 9.9094 | 3.43 | 4.87 | 213 0 19.8 | 213 |
| Aug. 1 | 9 2 49.54 | 2 53.89 | 18 9 41.0 | 9 23.6 | 9.31896 | 9.9208 | 3.43 | 4.86 | 214 0 20.9 | 214 |
| 2 | 9 7 49.12 | 7 53.67 | 17 49 26.1 | 49 7.4 | 9.31734 | 9.9316 | 3.44 | 4.85 | 215 0 21.9 | 215 |
| 3 | 9 12 47.58 | 12 52.32 | 17 28 41.2 | 28 21.2 | 9.31571 | 9.9419 | 3.44 | 4.84 | 216 0 22.9 | 216 |
| 4 | 9 17 44.91 | 17 49.84 | 17 7 27.2 | 7 5.7 | 9.31405 | 9.9518 | 3.44 | 4.83 | 217 0 24.0 | 217 |
| 5 | 9 22 41.10 | 22 46.23 | 16 45 44.7 | 45 21.8 | 9.31236 | 9.9611 | 3.44 | 4.81 | 218 0 25.0 | 218 |
| 6 | 9 27 36.14 | 27 41.47 | 16 23 34.6 | 23 10.3 | 9.31068 | 9.9700 | 3.44 | 4.81 | 219 0 26.0 | 219 |
| 7 | 9 32 30.05 | 32 35.54 | 16 0 57.5 | 0 31.9 | 9.30900 | 9.9785 | 3.43 | 4.80 | 220 0 26.9 | 220 |
| 8 | 9 37 22.83 | 37 28.47 | 15 37 54.0 | 37 27.1 | 9.30736 | 9.9868 | 3.43 | 4.78 | 221 0 27.8 | 221 |
| 9 | 9 42 14.51 | 42 20.31 | 15 14 24.8 | 13 56.5 | 9.30571 | 9.9945 | 3.42 | 4.77 | 222 0 28.7 | 222 |
| 10 | 9 47 5.09 | 47 11.06 | 14 50 30.7 | 50 0.9 | 9.30407 | 0.0020 | 3.41 | 4.76 | 223 0 29.7 | 223 |
| 11 | 9 51 54.58 | 52 0.71 | 14 26 12.4 | 25 41.2 | 9.30245 | 0.0091 | 3.40 | 4.74 | 224 0 30.5 | 224 |
| 12 | 9 56 43.00 | 56 49.28 | 14 1 30.7 | 0 58.1 | 9.30087 | 0.0158 | 3.40 | 4.73 | 225 0 31.4 | 225 |
| 13 | 10 1 30.38 | 1 36.80 | 13 36 26.2 | 35 52.3 | 9.29929 | 0.0223 | 3.39 | 4.71 | 226 0 32.2 | 226 |
| 14 | 10 6 16.73 | 6 23.30 | 13 10 59.6 | 10 24.3 | 9.29772 | 0.0285 | 3.38 | 4.70 | 227 0 33.1 | 227 |
| 15 | 10 11 2.08 | 11 8.78 | 12 45 11.7 | 44 35.0 | 9.29619 | 0.0343 | 3.37 | 4.68 | 228 0 33.9 | 228 |
| 16 | 10 15 46.43 | 15 53.26 | 12 19 3.3 | 18 25.3 | 9.29471 | 0.0399 | 3.35 | 4.67 | 229 0 34.7 | 229 |
| 17 | 10 20 29.82 | 20 36.77 | 11 52 35.0 | 51 55.7 | 9.29330 | 0.0453 | 3.33 | 4.65 | 230 0 35.4 | 230 |
| 18 | 10 25 12.29 | 25 19.36 | 11 25 47.5 | 25 7.0 | 9.29193 | 0.0504 | 3.33 | 4.64 | 231 0 36.1 | 231 |
| 19 | 10 29 53.88 | 30 1.08 | 10 58 41.5 | 57 59.7 | 9.29056 | 0.0552 | 3.31 | 4.61 | 232 0 36.9 | 232 |
| 20 | 10 34 34.59 | 34 41.93 | 10 31 17.8 | 30 34.6 | 9.28922 | 0.0598 | 3.30 | 4.60 | 233 0 37.7 | 233 |
| 21 | 10 39 14.46 | 39 21.92 | 10 3 37.1 | 2 52.6 | 9.28794 | 0.0642 | 3.28 | 4.58 | 234 0 38.4 | 234 |
| 22 | 10 43 53.52 | 44 1.09 | 9 35 40.1 | 34 54.3 | 9.28670 | 0.0683 | 3.25 | 4.56 | 235 0 39.2 | 235 |
| 23 | 10 48 31.80 | 48 39.48 | 9 7 27.5 | 6 40.5 | 9.28551 | 0.0722 | 3.23 | 4.53 | 236 0 39.8 | 236 |
| 24 | 10 53 9.34 | 53 17.14 | 8 39 0.0 | 38 11.8 | 9.28439 | 0.0759 | 3.22 | 4.51 | 237 0 40.5 | 237 |
| 25 | 10 57 46.18 | 57 54.10 | 8 10 18.3 | 9 28.9 | 9.28332 | 0.0794 | 3.20 | 4.49 | 238 0 41.2 | 238 |
| 26 | 11 2 22.35 | 2 30.38 | 7 41 23.3 | 40 32.6 | 9.28228 | 0.0826 | 3.18 | 4.47 | 239 0 41.9 | 239 |
| 27 | 11 6 57.88 | 7 6.01 | 7 12 15.7 | 11 23.8 | 9.28130 | 0.0857 | 3.15 | 4.44 | 240 0 42.5 | 240 |
| 28 | 11 11 32.80 | 11 41.04 | 6 42 56.1 | 42 3.1 | 9.28034 | 0.0885 | 3.11 | 4.41 | 241 0 43.2 | 241 |
| 29 | 11 16 7.14 | 16 15.48 | 6 13 25.4 | 12 31.3 | 9.27946 | 0.0912 | 3.08 | 4.38 | 242 0 43.8 | 242 |
| 30 | 11 20 40.95 | 20 49.38 | 5 43 44.2 | 42 49.1 | 9.27864 | 0.0937 | 3.05 | 4.35 | 243 0 44.4 | 243 |
| 31 | 11 25 14.27 | 25 22.80 | + 5 13 53.2 | 12 57.1 | +9.27790 | −0.0959 | −3.03 | −4.30 | 244 0 45.0 | 244 |

Note —The Transits precede the Noon opposite which they are given until July 14th, inclusive.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination. | | Log. Factor t. | | Log. Factor t². | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit. |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d | h. m. s. | m. s | ° ′ ″ | ′ ″ | | | | | d. h. m. | d. |
| Sept. 1 | 11 29 47.13 | 29 55.76 | + 4 43 53.3 | 42 56.1 | +9.27720 | −0.0980 | −2.96 | −4.26 | 245 0 45.6 | 245 |
| 2 | 11 34 19.56 | 34 28.29 | 4 13 45.2 | 12 47.0 | 9.27656 | 0.0998 | 2.91 | 4.22 | 246 0 46.2 | 246 |
| 3 | 11 38 51.61 | 39 0.45 | 3 43 29.8 | 42 30.6 | 9.27600 | 0.1015 | 2.87 | 4.17 | 247 0 46.8 | 247 |
| 4 | 11 43 23.33 | 43 32.27 | 3 13 7.6 | 12 7.5 | 9.27547 | 0.1031 | 2.85 | 4.11 | 248 0 47.4 | 248 |
| 5 | 11 47 54.74 | 48 3.78 | 2 42 39.4 | 41 38.4 | 9.27501 | 0.1044 | 2.73 | 4.05 | 249 0 48.0 | 249 |
| 6 | 11 52 25.88 | 52 35.02 | 2 12 6.0 | 11 4.0 | 9.27463 | 0.1056 | 2.64 | 3.98 | 250 0 48.6 | 250 |
| 7 | 11 56 56.80 | 57 6.03 | 1 41 28.0 | 40 25.2 | 9.27429 | 0.1065 | 2.61 | 3.89 | 251 0 49.1 | 251 |
| 8 | 12 1 27.53 | 1 36.87 | 1 10 46.3 | 9 42.6 | 9.27402 | 0.1073 | 2.50 | 3.76 | 252 0 49.7 | 252 |
| 9 | 12 5 58.11 | 6 7.56 | 0 40 1.5 | 38 57.0 | 9.27381 | 0.1079 | 2.16 | 3.61 | 253 0 50.3 | 253 |
| 10 | 12 10 28.59 | 10 38.14 | + 0 9 14.5 | 8 9.2 | 9.27369 | 0.1084 | −1.68 | 3.38 | 254 0 50.8 | 254 |
| 11 | 12 14 59.02 | 15 8.67 | − 0 21 34.1 | 22 40.1 | 9.27366 | 0.1086 | +2.16 | −2.98 | 255 0 51.4 | 255 |
| 12 | 12 19 29.45 | 19 39.21 | 0 52 23.5 | 53 30.3 | 9.27369 | 0.1088 | 2.23 | +2.88 | 256 0 52.0 | 256 |
| 13 | 12 23 59.91 | 24 9.78 | 1 23 13.2 | 24 20.6 | 9.27377 | 0.1088 | 2.42 | 3.42 | 257 0 52.5 | 257 |
| 14 | 12 28 30.44 | 28 40.42 | 1 54 2.4 | 55 10.5 | 9.27394 | 0.1086 | 2.56 | 3.66 | 258 0 53.1 | 258 |
| 15 | 12 33 1.10 | 33 11.19 | 2 24 50.4 | 25 59.2 | 9.27416 | 0.1082 | 2.68 | 3.80 | 259 0 53.7 | 259 |
| 16 | 12 37 31 92 | 37 42.12 | 2 55 36.3 | 56 45.8 | 9.27445 | 0.1076 | 2.78 | 3.89 | 260 0 54.2 | 260 |
| 17 | 12 42 2.95 | 42 13.26 | 3 26 19.5 | 27 29.6 | 9.27482 | 0.1069 | 2.89 | 3.98 | 261 0 54.8 | 261 |
| 18 | 12 46 34.24 | 46 44.68 | 3 56 59.2 | 58 9.9 | 9.27529 | 0.1060 | 2.91 | 4.05 | 262 0 55.4 | 262 |
| 19 | 12 51 5.85 | 51 16.42 | 4 27 34.7 | 28 46.0 | 9.27584 | 0.1049 | 2.95 | 4.12 | 263 0 56.0 | 263 |
| 20 | 12 55 37.81 | 55 48.51 | 4 58 5.4 | 59 17.2 | 9.27640 | 0.1036 | 3.00 | 4.17 | 264 0 56.6 | 264 |
| 21 | 13 0 10.14 | 0 20.97 | 5 28 30.4 | 29 42.8 | 9.27702 | 0.1023 | 3.05 | 4.22 | 265 0 57.2 | 265 |
| 22 | 13 4 42.89 | 4 53.85 | 5 58 49.2 | 60 2.1 | 9.27774 | 0.1007 | 3.10 | 4.26 | 266 0 57.8 | 266 |
| 23 | 13 9 16.13 | 9 27.22 | 6 29 1.0 | 30 14.3 | 9.27856 | 0.0989 | 3.12 | 4.31 | 267 0 58.4 | 267 |
| 24 | 13 13 49.90 | 14 1.13 | 6 59 4.9 | 60 18.6 | 9.27942 | 0.0969 | 3.15 | 4.35 | 268 0 59.0 | 268 |
| 25 | 13 18 24.22 | 18 35.59 | 7 29 0.2 | 30 14.3 | 9.28033 | 0.0947 | 3.19 | 4.38 | 269 0 59.6 | 269 |
| 26 | 13 22 59.13 | 23 10.66 | 7 58 46.1 | 60 0.7 | 9.28130 | 0.0924 | 3.21 | 4.41 | 270 1 0.3 | 270 |
| 27 | 13 27 34.69 | 27 46.36 | 8 28 21.9 | 29 36.9 | 9.28236 | 0.0898 | 3.22 | 4.43 | 271 1 0.9 | 271 |
| 28 | 13 32 10.92 | 32 22.75 | 8 57 46.8 | 59 2.1 | 9 28345 | 0.0871 | 3.25 | 4.47 | 272 1 1.6 | 272 |
| 29 | 13 36 47.84 | 36 59.85 | 9 27 0.1 | 28 15.6 | 9.28457 | 0.0840 | 3.27 | 4.50 | 273 1 2.3 | 273 |
| 30 | 13 41 25.51 | 41 37.67 | 9 56 0.9 | 57 16.7 | 9.28575 | 0.0808 | 3.29 | 4.53 | 274 1 2.9 | 274 |
| Oct. 1 | 13 46 3.96 | 46 16.28 | 10 24 48.3 | 26 4.4 | 9.28700 | 0.0773 | 3.31 | 4.54 | 275 1 3.6 | 275 |
| 2 | 13 50 43.23 | 50 55.73 | 10 53 21.5 | 54 37.8 | 9.28831 | 0.0737 | 3.32 | 4.56 | 276 1 4.4 | 276 |
| 3 | 13 55 23.36 | 55 36.04 | 11 21 40.0 | 22 56.4 | 9.28965 | 0.0699 | 3.34 | 4.59 | 277 1 5.1 | 277 |
| 4 | 14 0 4.36 | 0 17.22 | 11 49 43.2 | 50 59.7 | 9.29101 | 0.0656 | 3.35 | 4.62 | 278 1 5.8 | 278 |
| 5 | 14 4 46.26 | 4 59.32 | 12 17 30.1 | 18 46.8 | 9.29244 | 0.0613 | 3.37 | 4.63 | 279 1 6.6 | 279 |
| 6 | 14 9 29.10 | 9 42.36 | 12 44 59.7 | 46 16.5 | 9.29390 | 0.0567 | 3.38 | 4.65 | 280 1 7.4 | 280 |
| 7 | 14 14 12.91 | 14 26.36 | 13 12 11.1 | 13 27.9 | 9.29540 | 0.0518 | 3.40 | 4.67 | 281 1 8.1 | 281 |
| 8 | 14 18 57.72 | 19 11.37 | 13 39 3.6 | 40 20.4 | 9.29696 | 0.0466 | 3.40 | 4.69 | 282 1 8.9 | 282 |
| 9 | 14 23 43.57 | 23 57.43 | 14 5 36.7 | 6 53.4 | 9.29855 | 0.0412 | 3.41 | 4.70 | 283 1 9.8 | 283 |
| 10 | 14 28 30.46 | 28 44.55 | 14 31 49.5 | 33 6.1 | 9.30014 | 0.0355 | 3.42 | 4.72 | 284 1 10.6 | 284 |
| 11 | 14 33 18.42 | 33 32.75 | 14 57 41.1 | 58 57.6 | 9.30178 | 0.0294 | 3.44 | 4.74 | 285 1 11.5 | 285 |
| 12 | 14 38 7.49 | 38 22.04 | 15 23 10.7 | 24 27.0 | 9.30348 | 0.0231 | 3.44 | 4.75 | 286 1 12.3 | 286 |
| 13 | 14 42 57.69 | 43 12.47 | 15 48 17.6 | 49 33.6 | 9.30519 | 0.0164 | 3.44 | 4.76 | 287 1 13.2 | 287 |
| 14 | 14 47 49.03 | 48 4.05 | 16 13 1.1 | 14 16.8 | 9.30690 | 0.0095 | 3.45 | 4.78 | 288 1 14.1 | 288 |
| 15 | 14 52 41.52 | 52 56.80 | 16 37 20.5 | 38 35.9 | 9.30861 | 0.0022 | 3.47 | 4.79 | 289 1 15.1 | 289 |
| 16 | 14 57 35.19 | 57 50.74 | 17 1 14.8 | 2 29.9 | 9.31037 | 9.9945 | 3.46 | 4.80 | 290 1 16.1 | 290 |
| 17 | 15 2 30.06 | 2 45.87 | 17 24 43.2 | 25 57.9 | 9.31215 | 9.9863 | 3.49 | 4.82 | 291 1 17.0 | 291 |
| 18 | 15 7 26.15 | 7 42.22 | 17 47 45.0 | 48 59.2 | 9.31397 | 9.9779 | 3.47 | 4.83 | 292 1 18.0 | 292 |
| 19 | 15 12 23.48 | 12 39.82 | 18 10 19.6 | 11 33.2 | 9.31580 | 9.9691 | 3.47 | 4.84 | 293 1 19.0 | 293 |
| 20 | 15 17 22.06 | 17 38.68 | 18 32 26.1 | 33 39.0 | 9.31760 | 9.9597 | 3.47 | 4.85 | 294 1 20.0 | 294 |
| 21 | 15 22 21.88 | 22 38.80 | 18 54 3.7 | 55 15.9 | 9.31938 | 9.9499 | 3.49 | 4.86 | 295 1 21.1 | 295 |
| 22 | 15 27 22.93 | 27 40.15 | 19 15 11.6 | 16 23.1 | 9.32117 | 9.9396 | 3.49 | 4.87 | 296 1 22.2 | 296 |
| 23 | 15 32 25.22 | 32 42.74 | 19 35 49.0 | 36 59.7 | 9.32297 | 9.9288 | 3.47 | 4.88 | 297 1 23.3 | 297 |
| 24 | 15 37 28.76 | 37 46.59 | 19 55 55.3 | 57 5.0 | 9.32477 | 9.9174 | 3.47 | 4.89 | 298 1 24.4 | 298 |
| 25 | 15 42 33.55 | 42 51.70 | 20 15 29.6 | 16 38.4 | 9.32654 | 9.9055 | 3.47 | 4.90 | 299 1 25.6 | 299 |
| 26 | 15 47 39.57 | 47 58.04 | 20 34 31.3 | 35 39.0 | 9 32826 | 9.8929 | 3.46 | 4.92 | 300 1 26.7 | 300 |
| 27 | 15 52 46.80 | 53 5.59 | 20 52 59.6 | 54 6.2 | 9.32996 | 9.8797 | 3.47 | 4.92 | 301 1 27.9 | 301 |
| 28 | 15 57 55.23 | 58 14.35 | 21 10 53.8 | 11 59.2 | 9.33167 | 9.8657 | 3.46 | 4.93 | 302 1 29.1 | 302 |
| 29 | 16 3 4.86 | 3 24.32 | 21 28 13.0 | 29 17.1 | 9.33334 | 9.8510 | 3.43 | 4.94 | 303 1 30.3 | 303 |
| 30 | 16 8 15.66 | 8 35.47 | 21 44 56.6 | 45 59.3 | 9.33493 | 9.8355 | 3.42 | 4.95 | 304 1 31.6 | 304 |
| 31 | 16 13 27.59 | 13 47.74 | 22 1 4.0 | 2 5.1 | 9.33650 | 9.8190 | 3.42 | 4.96 | 305 1 32.8 | 305 |
| 32 | 16 18 40.63 | 19 1.12 | −22 16 34.4 | 17 34.0 | +9.33800 | −9.8019 | +3.41 | +4.96 | 306 1 34.1 | 306 |

NOTE — The Transits precede the Noon opposite which they are given until July 14th, inclusive.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

| Day of Month. | Apparent Right Ascension. | | Apparent Declination. | | Log. Factor $t$. | | Log. Factor $t^2$. | | Mean Solar Time of Meridian Transit. | Sidereal Date of Transit |
|---|---|---|---|---|---|---|---|---|---|---|
| | At Mean Noon. | At Transit. | At Mean Noon. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. | | |
| d. | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | | d. h. m. | d. |
| Nov. 1 | 16 18 40.63 | 19 1.12 | −22 16 34.4 | 17 34.0 | +9.33800 | −9.8019 | +3.41 | +4.96 | 306 1 34.1 | 306 |
| 2 | 16 23 54.74 | 24 15.59 | 22 31 27.2 | 32 25.1 | 9.33948 | 9.7831 | 3.39 | 4.97 | 307 1 35.5 | 307 |
| 3 | 16 29 9.90 | 29 31.12 | 22 45 41.7 | 46 37.8 | 9.34090 | 9.7635 | 3.37 | 4.98 | 308 1 36.8 | 308 |
| 4 | 16 34 26.07 | 34 47.65 | 22 59 17.4 | 60 11.6 | 9.34226 | 9.7428 | 3.36 | 4.98 | 309 1 38.1 | 309 |
| 5 | 16 39 43.21 | 40 5.14 | 23 12 13.8 | 13 5.9 | 9.34356 | 9.7205 | 3 33 | 4.99 | 310 1 39.4 | 310 |
| 6 | 16 45 1.28 | 45 23.56 | 23 24 30.1 | 25 20.1 | 9.34479 | 9.6967 | 3.32 | 4.99 | 311 1 40.7 | 311 |
| 7 | 16 50 20.23 | 50 42.88 | 23 36 5.9 | 36 53.7 | 9.34598 | 9.6712 | 3.29 | 5.00 | 312 1 42.1 | 312 |
| 8 | 16 55 40.03 | 56 3.05 | 23 47 0.7 | 47 46.2 | 9.34709 | 9.6438 | 3.26 | 5.00 | 313 1 43.5 | 313 |
| 9 | 17 1 0.62 | 1 24.01 | 23 57 13.9 | 57 56.9 | 9.34813 | 9.6143 | 3.22 | 5.01 | 314 1 44.9 | 314 |
| 10 | 17 6 21.95 | 6 45.70 | 24 6 45.0 | 7 25.5 | 9.34909 | 9.5822 | 3.21 | 5.01 | 315 1 46.3 | 315 |
| 11 | 17 11 43.97 | 12 8.08 | 24 15 33.8 | 16 11.7 | 9.34999 | 9.5472 | 3.17 | 5.02 | 316 1 47.7 | 316 |
| 12 | 17 17 6.63 | 17 31.11 | 24 23 39.8 | 24 14.9 | 9.35083 | 9.5086 | 3.09 | 5.02 | 317 1 49.2 | 317 |
| 13 | 17 22 29.88 | 22 54.73 | 24 31 2.5 | 31 34.7 | 9.35157 | 9.4660 | 3.05 | 5.02 | 318 1 50.6 | 318 |
| 14 | 17 27 53.64 | 28 18.86 | 24 37 41.7 | 38 10.9 | 9.35221 | 9.4185 | 2.98 | 5.03 | 319 1 52.1 | 319 |
| 15 | 17 33 17.85 | 33 43.43 | 24 43 37.2 | 44 3.3 | 9.35279 | 9.3648 | 2.95 | 5.03 | 320 1 53.5 | 320 |
| 16 | 17 38 42.47 | 39 8.41 | 24 48 48.5 | 49 11.5 | 9.35329 | 9.3028 | 2.86 | 5.03 | 321 1 55.0 | 321 |
| 17 | 17 44 7.44 | 44 33.76 | 24 53 15.3 | 53 35.0 | 9.35374 | 9.2300 | 2.76 | 5.03 | 322 1 56.6 | 322 |
| 18 | 17 49 32.71 | 49 59.40 | 24 56 57.5 | 57 13.7 | 9.35408 | 9.1427 | 2.53 | 5.03 | 323 1 58.1 | 323 |
| 19 | 17 54 58.20 | 55 25.24 | 24 59 55.0 | 60 7.6 | 9.35432 | 9.0318 | +2.29 | 5.04 | 324 1 59.6 | 324 |
| 20 | 18 0 23.83 | 0 51.20 | 25 2 7.5 | 2 16.5 | 9.35446 | 8.8846 | −1.86 | 5.03 | 325 2 1.0 | 325 |
| 21 | 18 5 49.53 | 6 17.22 | 25 3 34.9 | 3 40.2 | 9.35450 | 8.6509 | 1.98 | 5.03 | 326 2 2.4 | 326 |
| 22 | 18 11 15.24 | 11 43.25 | 25 4 17.1 | 4 18.7 | 9.35448 | −8.1372 | 2.46 | 5.04 | 327 2 3.9 | 327 |
| 23 | 18 16 40.90 | 17 9.24 | 25 4 14.2 | 4 11.8 | 9.35436 | +8.2499 | 2.64 | 5.04 | 328 2 5.4 | 328 |
| 24 | 18 22 6.43 | 22 35.11 | 25 3 26.0 | 3 19.6 | 9.35414 | 8.6920 | 2.76 | 5.04 | 329 2 6.9 | 329 |
| 25 | 18 27 31.76 | 28 0.76 | 25 1 52.6 | 1 42.1 | 9.35384 | 8.9059 | 2.89 | 5.04 | 330 2 8.4 | 330 |
| 26 | 18 32 56.83 | 33 26.12 | 24 59 34.1 | 59 19.4 | 9.35343 | 9.0487 | 2.99 | 5.04 | 331 2 9.8 | 331 |
| 27 | 18 38 21.55 | 38 51.14 | 24 56 30.5 | 56 11.5 | 9.35291 | 9.1558 | 3.06 | 5.03 | 332 2 11.3 | 332 |
| 28 | 18 43 45.85 | 44 15.74 | 24 52 41.9 | 52 18.6 | 9.35231 | 9.2418 | 3.10 | 5.03 | 333 2 12.8 | 333 |
| 29 | 18 49 9.67 | 49 39.84 | 24 48 8.4 | 47 40.7 | 9.35161 | 9.3128 | 3.16 | 5.03 | 334 2 14.2 | 334 |
| 30 | 18 54 32.93 | 55 3.38 | 24 42 50.4 | 42 18.2 | 9 35083 | 9.3734 | 3.22 | 5.03 | 335 2 15.8 | 335 |
| Dec. 1 | 18 59 55.57 | 0 26.28 | 24 36 48.2 | 36 11.4 | 9.34993 | 9.4263 | 3.26 | 5.03 | 336 2 17.2 | 336 |
| 2 | 19 5 17.51 | 5 48.47 | 24 30 2.0 | 29 20.5 | 9.34893 | 9.4733 | 3.30 | 5.02 | 337 2 18.7 | 337 |
| 3 | 19 10 38.68 | 11 9.89 | 24 22 32.0 | 21 45.9 | 9.34785 | 9.5154 | 3.32 | 5.02 | 338 2 20.1 | 338 |
| 4 | 19 15 59.02 | 16 30.46 | 24 14 18.6 | 13 27.8 | 9.34669 | 9.5535 | 3.35 | 5.01 | 339 2 21.4 | 339 |
| 5 | 19 21 18.48 | 21 50.11 | 24 5 22.1 | 4 26.6 | 9.34543 | 9.5882 | 3.37 | 5.00 | 340 2 22.7 | 340 |
| 6 | 19 26 36.99 | 27 8.81 | 23 55 43.1 | 54 42.8 | 9.34411 | 9.6200 | 3.40 | 5.00 | 341 2 24.1 | 341 |
| 7 | 19 31 54.50 | 32 26.51 | 23 45 22.0 | 44 16.9 | 9.34270 | 9.6493 | 3.42 | 5.00 | 342 2 25.4 | 342 |
| 8 | 19 37 10.95 | 37 43.15 | 23 34 19.2 | 33 9.3 | 9.34121 | 9.6764 | 3.44 | 4.99 | 343 2 26.8 | 343 |
| 9 | 19 42 26.29 | 42 58.66 | 23 22 35.2 | 21 20.5 | 9.33963 | 9.7016 | 3.46 | 4.99 | 344 2 28.1 | 344 |
| 10 | 19 47 40.46 | 48 12.99 | 23 10 10.5 | 8 50.9 | 9.33800 | 9.7253 | 3.47 | 4.98 | 345 2 29.4 | 345 |
| 11 | 19 52 53.43 | 53 26.10 | 22 57 5.6 | 55 41.1 | 9.33631 | 9.7474 | 3.48 | 4.97 | 346 2 30.6 | 346 |
| 12 | 19 58 5.16 | 58 37.97 | 22 43 21.1 | 41 51.8 | 9.33456 | 9.7681 | 3.50 | 4.97 | 347 2 31.9 | 347 |
| 13 | 20 3 15.61 | 3 48.55 | 22 28 57.7 | 27 23.6 | 9.33274 | 9.7876 | 3.51 | 4.96 | 348 2 33.1 | 348 |
| 14 | 20 8 24.75 | 8 57.80 | 22 13 55.9 | 12 17.0 | 9.33087 | 9.8058 | 3.48 | 4.96 | 349 2 34.3 | 349 |
| 15 | 20 13 32.54 | 14 5.70 | 21 58 16.4 | 56 32.6 | 9.32894 | 9.8232 | 3.53 | 4.95 | 350 2 35.5 | 350 |
| 16 | 20 18 38.95 | 19 12.21 | 21 41 59.6 | 40 11.0 | 9.32696 | 9.8397 | 3.54 | 4.94 | 351 2 36.7 | 351 |
| 17 | 20 23 43.95 | 24 17.29 | 21 25 6.1 | 23 12.8 | 9.32493 | 9.8552 | 3.54 | 4.93 | 352 2 37.8 | 352 |
| 18 | 20 28 47.51 | 29 20.92 | 21 7 36.8 | 5 38.9 | 9.32287 | 9.8697 | 3.55 | 4.92 | 353 2 38.9 | 353 |
| 19 | 20 33 49.63 | 34 23.10 | 20 49 32.5 | 47 29.9 | 9.32077 | 9.8837 | 3.55 | 4.91 | 354 2 40.0 | 354 |
| 20 | 20 38 50.27 | 39 23.81 | 20 30 53.9 | 28 46.6 | 9.31863 | 9.8970 | 3.56 | 4.90 | 355 2 41.1 | 355 |
| 21 | 20 43 49.43 | 44 23.01 | 20 11 41.4 | 9 29.5 | 9.31645 | 9.9097 | 3.56 | 4.89 | 356 2 42.1 | 356 |
| 22 | 20 48 47.08 | 49 20.70 | 19 51 55.7 | 49 39.3 | 9.31424 | 9.9216 | 3.56 | 4.88 | 357 2 43.1 | 357 |
| 23 | 20 53 43.21 | 54 16.86 | 19 31 37.6 | 29 16.8 | 9.31201 | 9.9330 | 3.56 | 4.87 | 358 2 44.1 | 358 |
| 24 | 20 58 37.81 | 59 11.49 | 19 10 48.0 | 8 22.7 | 9.30973 | 9.9439 | 3.58 | 4.86 | 359 2 45.1 | 359 |
| 25 | 21 3 30.86 | 4 4.56 | 18 49 27.6 | 46 57.9 | 9.30743 | 9.9542 | 3.57 | 4.85 | 360 2 46.1 | 360 |
| 26 | 21 8 22.36 | 8 56.06 | 18 27 37.1 | 25 3.2 | 9.30512 | 9.9640 | 3.58 | 4.84 | 361 2 47.0 | 361 |
| 27 | 21 13 12.31 | 13 45.99 | 18 5 17.3 | 2 39.3 | 9.30279 | 9.9734 | 3.58 | 4.83 | 362 2 47.8 | 362 |
| 28 | 21 18 0.70 | 18 34.37 | 17 42 28.9 | 39 46.8 | 9.30044 | 9.9824 | 3.58 | 4.81 | 363 2 48.7 | 363 |
| 29 | 21 22 47.52 | 23 21.18 | 17 19 12.8 | 16 26.6 | 9.29806 | 9.9908 | 3.57 | 4.80 | 364 2 49.5 | 364 |
| 30 | 21 27 32.75 | 28 6.40 | 16 55 29.9 | 52 39.7 | 9.29562 | 9.9989 | 3.57 | 4.78 | 365 2 50.4 | 365 |
| 31 | 21 32 16.36 | 32 50.02 | −16 31 20.9 | 28 29.2 | +9.29320 | +0.0068 | −3.57 | +4.77 | 366 2 51.2 | 366 |

Note — The Transits precede the Noon opposite which they are given until July 14th, inclusive.

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of *t* in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Jan. 0 17 53.0 | 0 | 12 33 23.78 | 34 13.14 | – 1 7 41.5 | 12 31.5 | +8.81698 | –9.5867 | –3.39 | +4.28 |
| 1 17 50.6 | 1 | 12 34 57.76 | 35 46.62 | 1 16 53.7 | 21 40.6 | 8.81213 | 9.5809 | 3.39 | 4.28 |
| 2 17 48.3 | 2 | 12 36 30.63 | 37 19.05 | 1 25 58.7 | 30 42.4 | 8.80717 | 9.5751 | 3.36 | 4.27 |
| 3 17 45.9 | 3 | 12 38 2.49 | 38 50.42 | 1 34 56.5 | 39 36.9 | 8.80249 | 9.5692 | 3.37 | 4.23 |
| 4 17 43.5 | 4 | 12 39 33.38 | 40 21.05 | 1 43 47.0 | 48 24.2 | 8.79814 | 9.5634 | 3.38 | 4.24 |
| 5 17 41.1 | 5 | 12 41 3.44 | 41 50.72 | 1 52 30.4 | 57 4.4 | 8.79396 | 9.5575 | 3.38 | 4.24 |
| 6 17 38.6 | 6 | 12 42 32.54 | 43 19.38 | 2 1 6.6 | 5 37.2 | 8.78910 | 9.5514 | 3.39 | 4.25 |
| 7 17 36.1 | 7 | 12 44 0.63 | 44 47.01 | 2 9 35.4 | 14 2.7 | 8.78393 | 9.5452 | 3.40 | 4.26 |
| 8 17 33.6 | 8 | 12 45 27.70 | 46 13.57 | 2 17 56.9 | 22 20.9 | 8.77871 | 9.5388 | 3.41 | 4.28 |
| 9 17 31.1 | 9 | 12 46 53.67 | 47 39.04 | 2 26 11.0 | 30 31.1 | 8.77316 | 9.5319 | 3.42 | 4.29 |
| 10 17 28.6 | 10 | 12 48 18.54 | 49 3.41 | 2 34 17.0 | 38 33.2 | 8.76755 | 9.5244 | 3.43 | 4.31 |
| 11 17 26.0 | 11 | 12 49 42.30 | 50 26.65 | 2 42 14.7 | 46 26.8 | 8.76171 | 9.5168 | 3.44 | 4.32 |
| 12 17 23.4 | 12 | 12 51 4.92 | 51 48.72 | 2 50 3.9 | 54 11.8 | 8.75558 | 9.5088 | 3.45 | 4.32 |
| 13 17 20.8 | 13 | 12 52 26.36 | 53 9.59 | 2 57 44.5 | 61 48.1 | 8.74919 | 9.5006 | 3.46 | 4.33 |
| 14 17 18.2 | 14 | 12 53 46.59 | 54 29.25 | 3 5 16.3 | 9 15.7 | 8.74266 | 9.4923 | 3.47 | 4.33 |
| 15 17 15.6 | 15 | 12 55 5.60 | 55 47.67 | 3 12 39.4 | 16 34.5 | 8.73592 | 9.4838 | 3.48 | 4.34 |
| 16 17 13.0 | 16 | 12 56 23.38 | 57 4.82 | 3 19 53.7 | 23 44.1 | 8.72884 | 9.4746 | 3.49 | 4.34 |
| 17 17 10.3 | 17 | 12 57 39.87 | 58 20.68 | 3 26 58.8 | 30 44.6 | 8.72154 | 9.4653 | 3.50 | 4.34 |
| 18 17 7.6 | 18 | 12 58 55.07 | 59 35.25 | 3 33 54.7 | 37 35.7 | 8.71407 | 9.4555 | 3.51 | 4.35 |
| 19 17 4.9 | 19 | 13 0 8.97 | 0 48.50 | 3 40 41.2 | 44 17.4 | 8.70637 | 9.4456 | 3.52 | 4.35 |
| 20 17 2.2 | 20 | 13 1 21.54 | 2 0.37 | 3 47 18.3 | 50 50.0 | 8.69813 | 9.4356 | 3.53 | 4.36 |
| 21 16 59.4 | 21 | 13 2 32.72 | 3 10.84 | 3 53 46.2 | 57 13.3 | 8.68961 | 9.4252 | 3.54 | 4.36 |
| 22 16 56.6 | 22 | 13 3 42.49 | 4 19.88 | 4 0 4.7 | 3 26.8 | 8.68079 | 9.4141 | 3.55 | 4.37 |
| 23 16 53.8 | 23 | 13 4 50.82 | 5 27.48 | 4 6 13.4 | 9 30.4 | 8.67167 | 9.4025 | 3.56 | 4.38 |
| 24 16 51.0 | 24 | 13 5 57.70 | 6 33.60 | 4 12 12.2 | 15 24.0 | 8.66202 | 9.3905 | 3.57 | 4.39 |
| 25 16 48.1 | 25 | 13 7 3.09 | 7 38.19 | 4 18 1.0 | 21 7.5 | 8.65208 | 9.3778 | 3.58 | 4.40 |
| 26 16 45.2 | 26 | 13 8 6.95 | 8 41.24 | 4 23 39.6 | 26 40.6 | 8.64164 | 9.3647 | 3.59 | 4.41 |
| 27 16 42.3 | 27 | 13 9 9.25 | 9 42.71 | 4 29 7.8 | 32 3.3 | 8.63058 | 9.3505 | 3.60 | 4.42 |
| 28 16 39.3 | 28 | 13 10 9.95 | 10 42.51 | 4 34 25.5 | 37 15.0 | 8.61874 | 9.3359 | 3.61 | 4.42 |
| 29 16 36.3 | 29 | 13 11 8.96 | 11 40.59 | 4 39 32.1 | 42 15.6 | 8.60603 | 9.3204 | 3.62 | 4.43 |
| 30 16 33.3 | 30 | 13 12 6.22 | 12 36.92 | 4 44 27.6 | 47 5.1 | 8.59287 | 9.3039 | 3.63 | 4.43 |
| 31 16 30.3 | 31 | 13 13 1.71 | 13 31.45 | 4 49 11.8 | 51 43.5 | 8.57890 | 9.2868 | 3.64 | 4.44 |
| Feb. 1 16 27.3 | 32 | 13 13 55.40 | 14 24.15 | 4 53 44.7 | 56 10.0 | 8.56414 | 9.2681 | 3.65 | 4.45 |
| 2 16 24.2 | 33 | 13 14 47.23 | 15 14.95 | 4 58 15.7 | 60 24.5 | 8.54827 | 9.2481 | 3.66 | 4.46 |
| 3 16 21.1 | 34 | 13 15 37.12 | 16 3.79 | 5 2 14.6 | 4 26.9 | 8.53126 | 9.2271 | 3.67 | 4.46 |
| 4 16 18.0 | 35 | 13 16 25.06 | 16 50.65 | 5 6 11.4 | 8 17.3 | 8.51337 | 9.2051 | 3.68 | 4.47 |
| 5 16 14.8 | 36 | 13 17 11.03 | 17 35.54 | 5 9 56.2 | 11 55.3 | 8.49442 | 9.1810 | 3.69 | 4.48 |
| 6 16 11.6 | 37 | 13 17 54.98 | 18 18.40 | 5 13 28.5 | 15 20.8 | 8.47441 | 9.1555 | 3.70 | 4.48 |
| 7 16 8.3 | 38 | 13 18 36.88 | 18 59.17 | 5 16 48.3 | 18 33.7 | 8.45280 | 9.1284 | 3.71 | 4.48 |
| 8 16 5.0 | 39 | 13 19 16.68 | 19 37.81 | 5 19 55.5 | 21 33.8 | 8.42972 | 9.0983 | 3.71 | 4.49 |
| 9 16 1.7 | 40 | 13 19 54.33 | 20 14.29 | 5 22 49.8 | 24 21.1 | 8.40475 | 9.0667 | 3.72 | 4.49 |
| 10 15 58.4 | 41 | 13 20 29.80 | 20 48.58 | 5 25 31.3 | 26 55.6 | 8.37813 | 9.0319 | 3.73 | 4.49 |
| 11 15 55.0 | 42 | 13 21 3.08 | 21 20.62 | 5 27 59.9 | 29 17.1 | 8.34884 | 8.9942 | 3.74 | 4.50 |
| 12 15 51.5 | 43 | 13 21 34.10 | 21 50.38 | 5 30 15.5 | 31 25.3 | 8.31698 | 8.9517 | 3.75 | 4.50 |
| 13 15 48.0 | 44 | 13 22 2.83 | 22 17.81 | 5 32 17.8 | 33 20.2 | 8.28198 | 8.9041 | 3.75 | 4.51 |
| 14 15 44.5 | 45 | 13 22 29.21 | 22 42.88 | 5 34 6.6 | 35 1.6 | 8.24322 | 8.8507 | 3.76 | 4.51 |
| 15 15 41.0 | 46 | 13 22 53.22 | 23 5.57 | 5 35 42.1 | 36 29.3 | 8.20009 | 8.7883 | 3.77 | 4.52 |
| 16 15 37.4 | 47 | 13 23 14.83 | 23 25.83 | 5 37 3.8 | 37 43.4 | 8.15113 | 8.7149 | 3.78 | 4.53 |
| 17 15 33.7 | 48 | 13 23 33.99 | 23 43.60 | 5 38 11.8 | 38 43.6 | 8.09450 | 8.6257 | 3.78 | 4.53 |
| 18 15 30.0 | 49 | 13 23 50.65 | 23 58.83 | 5 39 5.8 | 39 29.7 | 8.02824 | 8.5106 | 3.79 | 4.54 |
| 19 15 26.3 | 50 | 13 24 4.75 | 24 11.50 | 5 39 45.6 | 40 1.7 | 7.94901 | 8.3549 | 3.79 | 4.54 |
| 20 15 22.6 | 51 | 13 24 16.27 | 24 21.59 | 5 40 11.2 | 40 19.5 | 7.85116 | 8.1052 | 3.80 | 4.55 |
| 21 15 18.8 | 52 | 13 24 25.20 | 24 29.05 | 5 40 22.4 | 40 22.3 | 7.72125 | –7.3845 | 3.81 | 4.55 |
| 22 15 14.9 | 53 | 13 24 31.48 | 24 33.80 | 5 40 18.8 | 40 10.3 | 7.53152 | +7.9011 | 3.81 | 4.55 |
| 23 15 11.0 | 54 | 13 24 35.03 | 24 35.80 | 5 40 0.2 | 39 43.6 | +7.17489 | 8.2587 | 3.82 | 4.56 |
| 24 15 7.1 | 55 | 13 24 35.82 | 24 35.03 | 5 39 26.9 | 39 1.9 | –6.63283 | 8.4564 | 3.82 | 4.56 |
| 25 15 3.1 | 56 | 13 24 33.82 | 24 31.49 | 5 38 38.6 | 38 5.1 | 7.37064 | 8.5917 | 3.83 | 4.56 |
| 26 14 59.1 | 57 | 13 24 29.03 | 24 25.15 | 5 37 35.1 | 36 53.1 | 7.63283 | 8.6953 | 3.83 | 4.56 |
| 27 14 55.0 | 58 | 13 24 21.43 | 24 15.93 | 5 36 16.4 | 35 25.9 | 7.79853 | 8.7789 | 3.84 | 4.56 |
| 28 14 50.8 | 59 | 13 24 10.94 | 24 3.80 | 5 34 42.5 | 33 43.4 | 7.91962 | 8.8499 | 3.84 | 4.56 |
| 29 14 46.6 | 60 | 13 23 57.52 | 23 48.76 | 5 32 53.2 | 31 45.7 | 8.01392 | 8.9101 | 3.85 | 4.56 |
| 30 14 42.4 | 61 | 13 23 41.18 | 23 30.80 | – 5 30 48.7 | 29 32.8 | –8.09208 | +8.9629 | –3.85 | +4.56 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of t in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Mar. 1 14 42.4 | 61 | 13 23 41.18 | 23 30.80 | − 5 30 48.7 | 29 32.8 | −8.09208 | +8.9629 | −3.85 | +4.56 |
| 2 14 38.2 | 62 | 13 23 21.91 | 23 9.88 | 5 28 29.0 | 27 4.7 | 8.15871 | 9.0101 | 3.85 | 4.56 |
| 3 14 33.9 | 63 | 13 22 59.68 | 22 46.01 | 5 25 54.2 | 24 21.4 | 8.21629 | 9.0523 | 3.85 | 4.56 |
| 4 14 29.5 | 64 | 13 22 34.50 | 22 19.19 | 5 23 4.1 | 21 22.7 | 8.26728 | 9.0918 | 3.85 | 4.55 |
| 5 14 25.1 | 65 | 13 22 6.37 | 21 49.42 | 5 19 58.6 | 18 8.7 | 8.31290 | 9.1273 | 3.85 | 4.55 |
| 6 14 20.6 | 66 | 13 21 35.28 | 21 16.69 | 5 16 37.9 | 14 39.7 | 8.35432 | 9.1597 | 3.85 | 4.55 |
| 7 14 16.0 | 67 | 13 21 1.23 | 20 41.00 | 5 13 2.2 | 10 53.9 | 8.39213 | 9.1897 | 3.85 | 4.54 |
| 8 14 11.4 | 68 | 13 20 24.23 | 20 2.40 | 5 9 11.8 | 6 57.4 | 8.42646 | 9.2175 | 3.84 | 4.53 |
| 9 14 6.7 | 69 | 13 19 44.33 | 19 20.92 | 5 5 6.8 | 2 44.6 | 8.45765 | 9.2432 | 3.84 | 4.53 |
| 10 14 2.0 | 70 | 13 19 1.58 | 18 36.63 | 4 60 47.6 | 58 17.8 | 8.48675 | 9.2668 | 3.83 | 4.52 |
| 11 13 57.3 | 71 | 13 18 15.99 | 17 49.53 | 4 56 14.4 | 53 37.2 | 8.51346 | 9.2885 | 3.83 | 4.51 |
| 12 13 52.6 | 72 | 13 17 27.62 | 16 59.64 | 4 51 27.6 | 48 43.4 | 8.53863 | 9.3088 | 3.82 | 4.50 |
| 13 13 47.8 | 73 | 13 16 36.48 | 16 7.03 | 4 46 27.7 | 43 36.4 | 8.56184 | 9.3280 | 3.81 | 4.48 |
| 14 13 43.0 | 74 | 13 15 42.64 | 15 11.75 | 4 41 14.8 | 38 16.8 | 8.58348 | 9.3456 | 3.80 | 4.47 |
| 15 13 38.1 | 75 | 13 14 46.14 | 14 13.87 | 4 35 49.5 | 32 44.9 | 8.60349 | 9.3619 | 3.79 | 4.46 |
| 16 13 33.1 | 76 | 13 13 47.06 | 13 13.44 | 4 30 12.1 | 27 1.1 | 8.62234 | 9.3773 | 3.78 | 4.44 |
| 17 13 28.1 | 77 | 13 12 45.46 | 12 10.53 | 4 24 22.9 | 21 6.0 | 8.63985 | 9.3916 | 3.76 | 4.41 |
| 18 13 23.1 | 78 | 13 11 41.42 | 11 5.23 | 4 18 22.6 | 14 59.9 | 8.65608 | 9.4050 | 3.75 | 4.38 |
| 19 13 18.0 | 79 | 13 10 35.03 | 9 57.63 | 4 12 11.5 | 8 43.4 | 8.67116 | 9.4173 | 3.73 | 4.35 |
| 20 13 12.9 | 80 | 13 9 26.38 | 8 47.87 | 4 5 50.2 | 2 17.3 | 8.68504 | 9.4286 | 3.71 | 4.32 |
| 21 13 7.8 | 81 | 13 8 15.60 | 7 36.02 | 3 59 19.4 | 55 42.1 | 8.69789 | 9.4388 | 3.69 | 4.29 |
| 22 13 2.7 | 82 | 13 7 2.77 | 6 22.15 | 3 52 39.8 | 48 58.5 | 8.70994 | 9.4479 | 3.66 | 4.26 |
| 23 12 57.5 | 83 | 13 5 47.96 | 5 6.37 | 3 45 52.2 | 42 7.3 | 8.72108 | 9.4559 | 3.63 | 4.23 |
| 24 12 52.3 | 84 | 13 4 31.28 | 3 48.80 | 3 38 57.4 | 35 8.8 | 8.73142 | 9.4638 | 3.60 | 4.19 |
| 25 12 47.1 | 85 | 13 3 12.85 | 2 29.53 | 3 31 55.6 | 28 3.7 | 8.74081 | 9.4704 | 3.56 | 4.10 |
| 26 12 41.8 | 86 | 13 1 52.77 | 1 8.72 | 3 24 47.6 | 20 53.6 | 8.74914 | 9.4756 | 3.53 | 4.01 |
| 27 12 36.5 | 87 | 12 60 31.21 | 59 46.50 | 3 17 35.0 | 13 39.2 | 8.75674 | 9.4800 | 3.48 | 3.97 |
| 28 12 31.2 | 88 | 12 59 8.31 | 58 23.00 | 3 10 18.4 | 6 20.9 | 8.76348 | 9.4840 | 3.43 | 3.86 |
| 29 12 25.9 | 89 | 12 57 44.20 | 56 58.37 | 2 62 58.2 | 58 59.5 | 8.76940 | 9.4869 | 3.38 | 3.68 |
| 30 12 20.5 | 90 | 12 56 19.03 | 55 32.82 | 2 55 35.3 | 51 36.2 | 8.77420 | 9.4889 | 3.29 | +3.38 |
| 31 12 15.1 | 91 | 12 54 53.00 | 54 6.48 | 2 48 10.8 | 44 11.9 | 8.77826 | 9.4898 | 3.17 | −2.86 |
| Apr. 1 12 9.7 | 92 | 12 53 26.25 | 52 39.48 | 2 40 45.7 | 36 47.5 | 8.78145 | 9.4898 | 3.01 | 3.38 |
| 2 12 4.3 | 93 | 12 51 58.94 | 51 12.03 | 2 33 21.1 | 29 23.8 | 8.78374 | 9.4891 | 2.80 | 3.61 |
| 3 11 58.9 | 94 | 12 50 31.25 | 49 44.29 | 2 25 57.7 | 22 1.7 | 8.78522 | 9.4876 | −2.38 | 3.78 |
| 4 11 53.5 | 95 | 12 49 3.35 | 48 16.44 | 2 18 36.4 | 14 42.0 | 8.78581 | 9.4852 | +2.38 | 3.99 |
| 5 11 48.2 | 96 | 12 47 35.41 | 46 48.64 | 2 11 18.0 | 7 26.5 | 8.78551 | 9.4812 | 2.76 | 4.11 |
| 6 11 42.8 | 97 | 12 46 7.61 | 45 21.04 | 2 4 4.2 | 0 16.3 | 8.78453 | 9.4758 | 3.04 | 4.20 |
| 7 11 37.4 | 98 | 12 44 40.09 | 43 53.87 | 1 56 56.2 | 53 12.5 | 8.78240 | 9.4692 | 3.18 | 4.23 |
| 8 11 32.0 | 99 | 12 43 13.08 | 42 27.30 | 1 49 55.1 | 46 15.4 | 8.77946 | 9.4620 | 3.27 | 4.27 |
| 9 11 26.6 | 100 | 12 41 46.75 | 41 1.47 | 1 43 1.3 | 39 25.9 | 8.77575 | 9.4540 | 3.34 | 4.31 |
| 10 11 21.3 | 101 | 12 40 21.24 | 39 36.52 | 1 36 15.6 | 32 43.1 | 8.77129 | 9.4450 | 3.38 | 4.37 |
| 11 11 16.0 | 102 | 12 38 56.68 | 38 12.61 | 1 29 38.9 | 26 13.9 | 8.76591 | 9.4345 | 3.46 | 4.41 |
| 12 11 10.7 | 103 | 12 37 33.24 | 36 49.88 | 1 23 12.2 | 19 53.1 | 8.75978 | 9.4227 | 3.54 | 4.44 |
| 13 11 5.4 | 104 | 12 36 11.06 | 35 28.55 | 1 16 56.3 | 13 43.3 | 8.75229 | 9.4098 | 3.57 | 4.47 |
| 14 11 0.1 | 105 | 12 34 50.36 | 34 8.74 | 1 10 51.9 | 7 45.9 | 8.74418 | 9.3951 | 3.60 | 4.50 |
| 15 10 54.9 | 106 | 12 33 31.25 | 32 50.55 | 1 5 0.1 | 2 11.7 | 8.73525 | 9.3792 | 3.63 | 4.51 |
| 16 10 49.7 | 107 | 12 32 13.82 | 31 34.10 | 0 59 21.8 | 56 40.9 | 8.72552 | 9.3619 | 3.65 | 4.52 |
| 17 10 44.5 | 108 | 12 30 58.18 | 30 19.49 | 0 53 57.2 | 51 23.6 | 8.71498 | 9.3438 | 3.67 | 4.54 |
| 18 10 39.4 | 109 | 12 29 44.43 | 29 6.82 | 0 48 46.4 | 46 20.3 | 8.70346 | 9.3244 | 3.70 | 4.55 |
| 19 10 34.3 | 110 | 12 28 32.68 | 27 56.22 | 0 43 49.7 | 41 21.4 | 8.69096 | 9.3028 | 3.72 | 4.57 |
| 20 10 29.2 | 111 | 12 27 23.05 | 26 47.78 | 0 39 8.0 | 36 47.8 | 8.67746 | 9.2793 | 3.74 | 4.58 |
| 21 10 24.2 | 112 | 12 26 15.63 | 25 41.62 | 0 34 41.8 | 32 30.5 | 8.66274 | 9.2527 | 3.76 | 4.60 |
| 22 10 19.2 | 113 | 12 25 10.54 | 24 37.85 | 0 30 32.1 | 28 29.4 | 8.64669 | 9.2244 | 3.77 | 4.61 |
| 23 10 14.2 | 114 | 12 24 7.89 | 23 36.54 | 0 26 38.8 | 24 45.0 | 8.62960 | 9.1936 | 3.78 | 4.61 |
| 24 10 9.3 | 115 | 12 23 7.75 | 22 37.75 | 0 23 2.4 | 21 17.5 | 8.61137 | 9.1599 | 3.79 | 4.62 |
| 25 10 4.4 | 116 | 12 22 10.18 | 21 41.51 | 0 19 43.0 | 18 6.9 | 8.59210 | 9.1230 | 3.80 | 4.62 |
| 26 9 59.6 | 117 | 12 21 15.18 | 20 47.89 | 0 16 40.7 | 15 13.6 | 8.57146 | 9.1817 | 3.81 | 4.63 |
| 27 9 54.8 | 118 | 12 20 22.83 | 19 56.96 | 0 13 55.8 | 12 37.8 | 8.54903 | 9.0355 | 3.82 | 4.64 |
| 28 9 50.1 | 119 | 12 19 33.20 | 19 8.79 | 0 11 28.5 | 10 19.6 | 8.52493 | 8.9831 | 3.83 | 4.64 |
| 29 9 45.4 | 120 | 12 18 46.35 | 18 23.41 | 0 9 18.9 | 8 19.4 | 8.49883 | 8.9228 | 3.83 | 4.65 |
| 30 9 40.8 | 121 | 12 18 2.32 | 17 40.89 | 0 7 27.4 | 6 37.4 | 8.47077 | 8.8516 | 3.84 | 4.65 |
| 31 9 36.2 | 122 | 12 17 21.16 | 17 1.23 | − 0 5 54.2 | 5 13.8 | −8.44054 | +8.7647 | +3.84 | −4.65 |

# MARS, 1856.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| May 1 9 36.2 | 122 | 12 17 21.16 | 17 1.23 | − 0 5 54.2 | 5 13.8 | −8.44054 | +8.7647 | +3.84 | −4.65 |
| 2 9 31.6 | 123 | 12 16 42.88 | 16 24.45 | 0 4 39.5 | 4 8.6 | 8.40770 | 8.6573 | 3.85 | 4.65 |
| 3 9 27.1 | 124 | 12 16 7.50 | 15 50.58 | 0 3 43.3 | 3 22.0 | 8.37192 | 8.5116 | 3.85 | 4.64 |
| 4 9 22.7 | 125 | 12 15 35.05 | 15 19.63 | 0 3 5.7 | 2 53.8 | 8.33222 | 8.2922 | 3.86 | 4.64 |
| 5 9 18.4 | 126 | 12 15 5.54 | 14 51.61 | 0 2 46.6 | 2 43.7 | 8.28961 | +7.8490 | 3.86 | 4.64 |
| 6 9 14.1 | 127 | 12 14 38.98 | 14 26.57 | 0 2 45.6 | 2 51.7 | 8.24063 | −7.7435 | 3.86 | 4.64 |
| 7 9 9.8 | 128 | 12 14 15.40 | 14 4.55 | 0 3 2.6 | 3 18.0 | 8.18464 | 8.2636 | 3.86 | 4.64 |
| 8 9 5.6 | 129 | 12 13 54.84 | 13 45.55 | 0 3 37.9 | 4 2.7 | 8.12079 | 8.4926 | 3.85 | 4.63 |
| 9 9 1.4 | 130 | 12 13 37.30 | 13 29.50 | 0 4 31.5 | 5 5.5 | 8.04727 | 8.6404 | 3.85 | 4.63 |
| 10 8 57.2 | 131 | 12 13 22.71 | 13 16.38 | 0 5 43.1 | 6 26.2 | 7.95970 | 8.7489 | 3.85 | 4.63 |
| 11 8 53.1 | 132 | 12 13 11.04 | 13 6.20 | 0 7 12.4 | 8 4.5 | 7.84947 | 8.8343 | 3.84 | 4.62 |
| 12 8 49.1 | 133 | 12 13 2.29 | 12 58.94 | 0 8 59.2 | 10 0.3 | 7.70317 | 8.9052 | 3.84 | 4.61 |
| 13 8 45.1 | 134 | 12 12 56.44 | 12 54.55 | 0 11 3.4 | 12 13.1 | 7.48488 | 8.9649 | 3.83 | 4.61 |
| 14 8 41.1 | 135 | 12 12 53.45 | 12 52.99 | 0 13 24.5 | 14 42.9 | −7.03910 | 9.0168 | 3.83 | 4.60 |
| 15 8 37.1 | 136 | 12 12 53.27 | 12 54.25 | 0 16 2.5 | 17 29.3 | +6.93386 | 9.0623 | 3.82 | 4.59 |
| 16 8 33.2 | 137 | 12 12 55.89 | 12 58.28 | 0 18 56.9 | 20 32.1 | 7.44467 | 9.1031 | 3.82 | 4.58 |
| 17 8 29.3 | 138 | 12 13 1.26 | 13 5.06 | 0 22 7.6 | 23 50.9 | 7.67039 | 9.1397 | 3.81 | 4.57 |
| 18 8 25.5 | 139 | 12 13 9.36 | 13 14.53 | 0 25 34.2 | 27 25.5 | 7.81679 | 9.1730 | 3.81 | 4.57 |
| 19 8 21.8 | 140 | 12 13 20.14 | 13 26.65 | 0 29 16.5 | 31 15.6 | 7.92394 | 9.2031 | 3.80 | 4.56 |
| 20 8 18.2 | 141 | 12 13 33.55 | 13 41.39 | 0 33 14.1 | 35 21.0 | 8.00923 | 9.2310 | 3.80 | 4.55 |
| 21 8 14.6 | 142 | 12 13 49.56 | 13 58.74 | 0 37 26.8 | 39 41.4 | 8.07999 | 9.2567 | 3.79 | 4.54 |
| 22 8 11.0 | 143 | 12 14 8.16 | 14 18.65 | 0 41 54.4 | 44 16.6 | 8.13995 | 9.2808 | 3.79 | 4.54 |
| 23 8 7.4 | 144 | 12 14 29.30 | 14 41.06 | 0 46 36.7 | 49 6.3 | 8.19166 | 9.3030 | 3.78 | 4.53 |
| 24 8 3.9 | 145 | 12 14 52.93 | 15 5.96 | 0 51 33.3 | 54 10.2 | 8.23751 | 9.3238 | 3.78 | 4.53 |
| 25 8 0.4 | 146 | 12 15 19.03 | 15 33.28 | 0 56 44.0 | 59 28.1 | 8.27787 | 9.3435 | 3.77 | 4.52 |
| 26 7 57.0 | 147 | 12 15 47.53 | 16 3.00 | 1 2 8.6 | 4 59.8 | 8.31436 | 9.3619 | 3.76 | 4.51 |
| 27 7 53.6 | 148 | 12 16 18.40 | 16 35.10 | 1 7 46.8 | 10 45.2 | 8.34776 | 9.3795 | 3.75 | 4.50 |
| 28 7 50.2 | 149 | 12 16 51.64 | 17 9.56 | 1 13 38.6 | 16 43.9 | 8.37838 | 9.3959 | 3.75 | 4.50 |
| 29 7 46.9 | 150 | 12 17 27.21 | 17 46.31 | 1 19 43.6 | 22 55.6 | 8.40629 | 9.4114 | 3.74 | 4.49 |
| 30 7 43.6 | 151 | 12 18 5.05 | 18 25.32 | 1 26 1.5 | 29 20.2 | 8.43217 | 9.4263 | 3.73 | 4.48 |
| 31 7 40.4 | 152 | 12 18 45.14 | 19 6.58 | 1 32 32.2 | 35 57.4 | 8.45660 | 9.4403 | 3.72 | 4.47 |
| June 1 7 37.2 | 153 | 12 19 27.46 | 19 50.08 | 1 39 15.3 | 42 47.2 | 8.47953 | 9.4537 | 3.71 | 4.46 |
| 2 7 34.0 | 154 | 12 20 12.00 | 20 35.77 | 1 46 10.8 | 49 49.3 | 8.50093 | 9.4664 | 3.71 | 4.46 |
| 3 7 30.9 | 155 | 12 20 58.71 | 21 23.60 | 1 53 18.4 | 57 3.4 | 8.52078 | 9.4786 | 3.70 | 4.45 |
| 4 7 27.8 | 156 | 12 21 47.53 | 22 13.51 | 2 0 37.9 | 4 29.1 | 8.53932 | 9.4901 | 3.69 | 4.44 |
| 5 7 24.7 | 157 | 12 22 38.42 | 23 5.48 | 2 8 8.9 | 12 6.4 | 8.55686 | 9.5014 | 3.68 | 4.43 |
| 6 7 21.7 | 158 | 12 23 31.35 | 23 59.48 | 2 15 51.4 | 19 54.7 | 8.57340 | 9.5118 | 3.67 | 4.42 |
| 7 7 18.7 | 159 | 12 24 26.28 | 24 55.47 | 2 23 44.8 | 27 53.9 | 8.58917 | 9.5217 | 3.67 | 4.41 |
| 8 7 15.7 | 160 | 12 25 23.18 | 25 53.39 | 2 31 49.0 | 36 3.9 | 8.60394 | 9.5314 | 3.66 | 4.40 |
| 9 7 12.7 | 161 | 12 26 21.99 | 26 53.23 | 2 40 3.8 | 44 24.4 | 8.61808 | 9.5406 | 3.65 | 4.39 |
| 10 7 9.8 | 162 | 12 27 22.69 | 27 54.93 | 2 48 28.9 | 52 55.1 | 8.63150 | 9.5493 | 3.64 | 4.38 |
| 11 7 6.9 | 163 | 12 28 25.23 | 28 58.47 | 2 57 4.1 | 61 36.0 | 8.64417 | 9.5578 | 3.63 | 4.37 |
| 12 7 4.0 | 164 | 12 29 29.59 | 30 3.79 | 3 5 49.3 | 10 26.3 | 8.65635 | 9.5659 | 3.63 | 4.35 |
| 13 7 1.2 | 165 | 12 30 35.70 | 31 10.86 | 3 14 43.7 | 19 25.9 | 8.66774 | 9.5734 | 3.62 | 4.34 |
| 14 6 58.4 | 166 | 12 31 43.54 | 32 19.67 | 3 23 47.2 | 28 34.5 | 8.67872 | 9.5806 | 3.61 | 4.33 |
| 15 6 55.7 | 167 | 12 32 53.11 | 33 30.17 | 3 32 59.6 | 37 52.2 | 8.68937 | 9.5875 | 3.60 | 4.32 |
| 16 6 53.0 | 168 | 12 34 4.35 | 34 42.33 | 3 42 20.9 | 47 18.3 | 8.69946 | 9.5942 | 3.59 | 4.31 |
| 17 6 50.3 | 169 | 12 35 17.23 | 35 56.11 | 3 51 20.5 | 56 52.8 | 8.70908 | 9.6005 | 3.59 | 4.29 |
| 18 6 47.6 | 170 | 12 36 31.71 | 37 11.51 | 4 1 28.4 | 6 35.5 | 8.71833 | 9.6067 | 3.58 | 4.28 |
| 19 6 45.0 | 171 | 12 37 47.79 | 38 28.47 | 4 11 14.4 | 16 26.2 | 8.72727 | 9.6125 | 3.57 | 4.27 |
| 20 6 42.4 | 172 | 12 39 5.42 | 39 46.96 | 4 21 8.3 | 26 24.7 | 8.73592 | 9.6183 | 3.56 | 4.26 |
| 21 6 39.8 | 173 | 12 40 24.56 | 41 6.97 | 4 31 9.9 | 36 30.8 | 8.74413 | 9.6237 | 3.56 | 4.25 |
| 22 6 37.2 | 174 | 12 41 45.20 | 42 28.49 | 4 41 18.9 | 46 44.2 | 8.75213 | 9.6289 | 3.55 | 4.23 |
| 23 6 34.6 | 175 | 12 43 7.33 | 43 51.48 | 4 51 35.1 | 57 4.7 | 8.75994 | 9.6338 | 3.55 | 4.22 |
| 24 6 32.0 | 176 | 12 44 30.91 | 45 15.92 | 5 1 58.3 | 7 32.3 | 8.76745 | 9.6386 | 3.54 | 4.21 |
| 25 6 29.5 | 177 | 12 45 55.94 | 46 41.78 | 5 12 28.5 | 18 6.7 | 8.77484 | 9.6434 | 3.53 | 4.20 |
| 26 6 27.0 | 178 | 12 47 22.40 | 48 9.07 | 5 23 5.4 | 28 47.8 | 8.78190 | 9.6479 | 3.53 | 4.18 |
| 27 6 24.5 | 179 | 12 48 50.26 | 49 37.78 | 5 33 48.9 | 39 35.5 | 8.78880 | 9.6522 | 3.52 | 4.17 |
| 28 6 22.1 | 180 | 12 50 19.52 | 51 7.88 | 5 44 38.9 | 50 29.5 | 8.79555 | 9.6565 | 3.52 | 4.15 |
| 29 6 19.7 | 181 | 12 51 50.16 | 52 39.33 | 5 55 35.0 | 61 29.4 | 8.80215 | 9.6605 | 3.51 | 4.14 |
| 30 6 17.3 | 182 | 12 53 22.14 | 54 12.13 | 6 6 37.0 | 12 35.2 | 8.80851 | 9.6645 | 3.50 | 4.12 |
| 31 6 15.0 | 183 | 12 54 55.45 | 55 46.27 | − 6 17 44.8 | 23 46.7 | +8.81470 | −9.6683 | +3.50 | −4.11 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d h m. | | h. m. s. | m. s | ° ′ ″ | ′ ″ | | | | |
| July 1 6 15.0 | 183 | 12 54 55.45 | 55 46.27 | − 6 17 44.8 | 23 46.7 | +8.81470 | −9.6683 | +3.50 | −4.11 |
| 2 6 12.7 | 184 | 12 56 30.09 | 57 21.73 | 6 28 58.2 | 35 3.8 | 8.82073 | 9.6719 | 3.49 | 4.09 |
| 3 6 10.3 | 185 | 12 58 6.04 | 58 58.50 | 6 40 17.1 | 46 26.5 | 8.82661 | 9.6753 | 3.49 | 4.08 |
| 4 6 8.0 | 186 | 12 59 43.29 | 0 36.55 | 6 51 41.4 | 57 54.4 | 8.83233 | 9.6784 | 3.48 | 4.06 |
| 5 6 5.7 | 187 | 13 1 21.81 | 2 15.87 | 7 3 10.8 | 9 27.3 | 8.83790 | 9.6814 | 3.47 | 4.04 |
| 6 6 3.5 | 188 | 13 3 1.59 | 3 56.43 | 7 14 45.1 | 21 5.1 | 8.84332 | 9.6845 | 3.47 | 4.02 |
| 7 6 1.3 | 189 | 13 4 42.60 | 5 38.22 | 7 26 24.2 | 32 47.6 | 8.84859 | 9.6874 | 3.46 | 4.01 |
| 8 5 59.1 | 190 | 13 6 24.83 | 7 21.21 | 7 38 7.9 | 44 34.5 | 8.85371 | 9.6902 | 3.46 | 3.99 |
| 9 5 56.9 | 191 | 13 8 8.24 | 9 5.38 | 7 49 55.9 | 56 25.6 | 8.85868 | 9.6929 | 3.45 | 3.97 |
| 10 5 54.7 | 192 | 13 9 52.81 | 10 50.70 | 8 1 48.1 | 8 20.8 | 8.86351 | 9.6955 | 3.44 | 3.95 |
| 11 5 52.5 | 193 | 13 11 38.51 | 12 37.16 | 8 13 44.2 | 20 20.0 | 8.86820 | 9.6979 | 3.44 | 3.93 |
| 12 5 50.4 | 194 | 13 13 25.34 | 14 24.75 | 8 25 44.2 | 32 23.1 | 8.87275 | 9.7002 | 3.43 | 3.91 |
| 13 5 48.3 | 195 | 13 15 13.28 | 16 13.44 | 8 37 48.0 | 44 29.7 | 8.87716 | 9.7023 | 3.43 | 3.89 |
| 14 5 46.2 | 196 | 13 17 2.33 | 18 3.22 | 8 49 55.2 | 56 39.9 | 8.88144 | 9.7042 | 3.42 | 3.86 |
| 15 5 44.1 | 197 | 13 18 52.46 | 19 54.09 | 9 2 5.8 | 8 53.3 | 8.88567 | 9.7059 | 3.42 | 3.80 |
| 16 5 42.0 | 198 | 13 20 43.67 | 21 46.05 | 9 14 19.5 | 21 9.2 | 8.88985 | 9.7075 | 3.41 | 3.74 |
| 17 5 39.9 | 199 | 13 22 35.96 | 23 39.09 | 9 26 35.6 | 33 27.4 | 8.89398 | 9.7090 | 3.41 | 3.68 |
| 18 5 37.9 | 200 | 13 24 29.32 | 25 33.18 | 9 38 53.9 | 45 47.6 | 8.89806 | 9.7104 | 3.40 | 3.66 |
| 19 5 35.9 | 201 | 13 26 23.73 | 27 28.32 | 9 51 14.1 | 58 9.6 | 8.90208 | 9.7116 | 3.40 | 3.64 |
| 20 5 33.9 | 202 | 13 28 19.18 | 29 24.51 | 10 3 36.0 | 10 33.4 | 8.90602 | 9.7127 | 3.40 | 3.64 |
| 21 5 31.9 | 203 | 13 30 15.68 | 31 21.76 | 10 15 59.7 | 22 59.1 | 8.90990 | 9.7137 | 3.40 | 3.62 |
| 22 5 29.9 | 204 | 13 32 13.22 | 33 20.05 | 10 28 25.1 | 35 26.7 | 8.91371 | 9.7147 | 3.39 | 3.60 |
| 23 5 27.9 | 205 | 13 34 11.79 | 35 19.36 | 10 40 52.3 | 47 56.1 | 8.91746 | 9.7156 | 3.39 | 3.56 |
| 24 5 26.0 | 206 | 13 36 11.38 | 37 19.68 | 10 53 21.3 | 0 27.0 | 8.92115 | 9.7164 | 3.39 | 3.50 |
| 25 5 24.1 | 207 | 13 38 11.98 | 39 21.02 | 11 5 51.8 | 12 59.3 | 8.92479 | 9.7173 | 3.39 | 3.44 |
| 26 5 22.2 | 208 | 13 40 13.59 | 41 23.38 | 11 18 23.6 | 25 32.9 | 8.92839 | 9.7181 | 3.39 | 3.38 |
| 27 5 20.3 | 209 | 13 42 16.20 | 43 26.75 | 11 30 56.6 | 38 7.6 | 8.93195 | 9.7187 | 3.38 | 3.28 |
| 28 5 18.4 | 210 | 13 44 19.82 | 45 31.13 | 11 43 30.6 | 50 43.1 | 8.93548 | 9.7192 | 3.38 | 3.08 |
| 29 5 16.6 | 211 | 13 46 24.44 | 47 36.51 | 11 56 5.4 | 3 19.2 | 8.93897 | 9.7196 | 3.38 | 2.88 |
| 30 5 14.8 | 212 | 13 48 30.06 | 49 42.90 | 12 8 40.7 | 15 55.9 | 8.94243 | 9.7199 | 3.38 | 2.68 |
| 31 5 13.0 | 213 | 13 50 36.68 | 51 50.29 | 12 21 16.5 | 28 33.0 | 8.94586 | 9.7201 | 3.38 | −2.38 |
| Aug. 1 5 11.2 | 214 | 13 52 44.31 | 53 58.68 | 12 33 52.5 | 41 10.2 | 8.94925 | 9.7202 | 3.37 | +2.68 |
| 2 5 9.4 | 215 | 13 54 52.93 | 56 8.07 | 12 46 28.6 | 53 47.5 | 8.95261 | 9.7201 | 3.37 | 2.98 |
| 3 5 7.7 | 216 | 13 57 2.55 | 58 18.47 | 12 59 4.6 | 6 24.6 | 8.95594 | 9.7200 | 3.37 | 3.23 |
| 4 5 5.9 | 217 | 13 59 13.17 | 0 29.85 | 13 11 40.4 | 19 1.0 | 8.95923 | 9.7198 | 3.87 | 3.33 |
| 5 5 4.2 | 218 | 14 1 24.76 | 2 42.20 | 13 24 15.4 | 31 36.6 | 8.96247 | 9.7194 | 3.37 | 3.42 |
| 6 5 2.5 | 219 | 14 3 37.32 | 4 55.52 | 13 36 49.5 | 44 11.4 | 8.96566 | 9.7188 | 3.36 | 3.50 |
| 7 5 0.8 | 220 | 14 5 50.84 | 7 9.82 | 13 49 22.6 | 56 44.9 | 8.96880 | 9.7181 | 3.36 | 3.58 |
| 8 4 59.1 | 221 | 14 8 5.33 | 9 25.08 | 14 1 54.3 | 9 16.9 | 8.97189 | 9.7172 | 3.36 | 3.64 |
| 9 4 57.4 | 222 | 14 10 20.77 | 11 41.28 | 14 14 24.5 | 21 47.2 | 8.97492 | 9.7164 | 3.36 | 3.70 |
| 10 4 55.7 | 223 | 14 12 37.14 | 13 58.41 | 14 26 53.0 | 34 15.5 | 8.97790 | 9.7154 | 3.36 | 3.73 |
| 11 4 54.1 | 224 | 14 14 54.44 | 16 16.47 | 14 39 19.4 | 46 41.6 | 8.98083 | 9.7142 | 3.35 | 3.74 |
| 12 4 52.5 | 225 | 14 17 12.66 | 18 35.47 | 14 51 43.5 | 59 5.5 | 8.98371 | 9.7128 | 3.35 | 3.74 |
| 13 4 50.9 | 226 | 14 19 31.81 | 20 55.40 | 15 4 5.3 | 11 27.2 | 8.98653 | 9.7114 | 3.35 | 3.74 |
| 14 4 49.3 | 227 | 14 21 51.88 | 23 16.25 | 15 16 24.9 | 23 46.9 | 8.98934 | 9.7101 | 3.35 | 3.75 |
| 15 4 47.7 | 228 | 14 24 12.86 | 25 38.01 | 15 28 42.4 | 36 4.6 | 8.99214 | 9.7088 | 3.35 | 3.79 |
| 16 4 46.1 | 229 | 14 26 34.75 | 28 0.70 | 15 40 57.9 | 48 20.4 | 8.99493 | 9.7075 | 3.34 | 3.84 |
| 17 4 44.5 | 230 | 14 28 57.56 | 30 24.31 | 15 53 11.4 | 0 34.2 | 8.99772 | 9.7062 | 3.34 | 3.88 |
| 18 4 43.0 | 231 | 14 31 21.29 | 32 48.84 | 16 5 22.7 | 12 45.7 | 9.00050 | 9.7048 | 3.34 | 3.92 |
| 19 4 41.5 | 232 | 14 33 45.93 | 35 14.28 | 16 17 31.5 | 24 53.7 | 9.00325 | 9.7031 | 3.34 | 3.95 |
| 20 4 40.0 | 233 | 14 36 11.48 | 37 40.66 | 16 29 37.0 | 36 57.6 | 9.00598 | 9.7011 | 3.34 | 3.98 |
| 21 4 38.5 | 234 | 14 38 37.95 | 40 7.92 | 16 41 38.4 | 48 57.3 | 9.00869 | 9.6988 | 3.34 | 4.00 |
| 22 4 37.0 | 235 | 14 41 5.33 | 42 36.11 | 16 53 35.5 | 0 53.0 | 9.01138 | 9.6962 | 3.34 | 4.03 |
| 23 4 35.6 | 236 | 14 43 33.62 | 45 6.22 | 17 5 28.4 | 12 44.3 | 9.01405 | 9.6933 | 3.34 | 4.05 |
| 24 4 34.2 | 237 | 14 46 2.82 | 47 35.25 | 17 17 16.8 | 24 30.9 | 9.01671 | 9.6903 | 3.34 | 4.06 |
| 25 4 32.8 | 238 | 14 48 32.94 | 50 6.20 | 17 29 0.4 | 36 12.5 | 9.01935 | 9.6873 | 3.34 | 4.07 |
| 26 4 31.4 | 239 | 14 51 3.98 | 52 38.06 | 17 40 38.9 | 47 49.1 | 9.02198 | 9.6842 | 3.33 | 4.08 |
| 27 4 30.0 | 240 | 14 53 35.93 | 55 10.84 | 17 52 12.3 | 59 20.9 | 9.02460 | 9.6811 | 3.33 | 4.09 |
| 28 4 28.6 | 241 | 14 56 8.79 | 57 44.54 | 18 3 40.8 | 10 47.7 | 9.02721 | 9.6779 | 3.33 | 4.10 |
| 29 4 27.2 | 242 | 14 58 42.56 | 0 19.16 | 18 15 4.3 | 22 9.2 | 9.02979 | 9.6747 | 3.33 | 4.11 |
| 30 4 25.9 | 243 | 15 1 17.24 | 2 54.70 | 18 26 22.5 | 33 25.3 | 9.03234 | 9.6713 | 3.33 | 4.12 |
| 31 4 24.6 | 244 | 15 3 52.84 | 5 31.14 | −18 37 35.3 | 44 35.8 | +9.03485 | −9.6677 | +3.32 | +4.13 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | | | Sidereal Date. | Apparent Right Ascension. | | | | | Apparent Declination. | | | | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | At Sidereal 0h. | | | At Transit. | | At Sidereal 0h. | | | At Transit. | | In R. A. | In Dec. | In R. A. | In Dec. |
| d. | h. | m. | | h. | m. | s. | m. | s. | ° | ′ | ″ | ′ | ″ | | | | |
| Sept. 1 | 4 | 23.3 | 245 | 15 | 6 | 29.33 | 8 | 8.47 | −18 | 48 | 42.5 | 55 | 40.7 | +9.03733 | −9.6639 | +3.32 | +4.15 |
| 2 | 4 | 22.0 | 246 | 15 | 9 | 6.70 | 10 | 46.69 | 18 | 59 | 44.1 | 6 | 39.8 | 9.03978 | 9.6599 | 3.32 | 4.16 |
| 3 | 4 | 20.7 | 247 | 15 | 11 | 44.96 | 13 | 25.80 | 19 | 10 | 39.7 | 17 | 32.8 | 9.04222 | 9.6557 | 3.32 | 4.18 |
| 4 | 4 | 19.4 | 248 | 15 | 14 | 24.11 | 16 | 5.81 | 19 | 21 | 29.3 | 28 | 19.1 | 9.04464 | 9.6513 | 3.32 | 4.19 |
| 5 | 4 | 18.1 | 249 | 15 | 17 | 4.15 | 18 | 46.72 | 19 | 32 | 12.0 | 38 | 58.3 | 9.04704 | 9.6467 | 3.31 | 4.21 |
| 6 | 4 | 16.9 | 250 | 15 | 19 | 45.08 | 21 | 28.51 | 19 | 42 | 47.4 | 49 | 30.0 | 9.04942 | 9.6419 | 3.31 | 4.22 |
| 7 | 4 | 15.7 | 251 | 15 | 22 | 26.89 | 24 | 11.19 | 19 | 53 | 15.3 | 59 | 54.1 | 9.05177 | 9.6369 | 3.31 | 4.24 |
| 8 | 4 | 14.5 | 252 | 15 | 25 | 9.58 | 26 | 54.75 | 20 | 3 | 35.6 | 10 | 10.7 | 9.05411 | 9.6317 | 3.31 | 4.25 |
| 9 | 4 | 13.3 | 253 | 15 | 27 | 53.14 | 29 | 39.19 | 20 | 13 | 48.3 | 20 | 19.0 | 9.05643 | 9.6263 | 3.31 | 4.26 |
| 10 | 4 | 12.1 | 254 | 15 | 30 | 37.58 | 32 | 24.51 | 20 | 23 | 53.3 | 30 | 20.7 | 9.05874 | 9.6207 | 3.30 | 4.27 |
| 11 | 4 | 10.9 | 255 | 15 | 33 | 22.90 | 35 | 10.72 | 20 | 33 | 50.3 | 40 | 13.7 | 9.06104 | 9.6148 | 3.30 | 4.28 |
| 12 | 4 | 9.7 | 256 | 15 | 36 | 9.08 | 37 | 57.78 | 20 | 43 | 39.3 | 49 | 58.6 | 9.06331 | 9.6087 | 3.30 | 4.29 |
| 13 | 4 | 8.5 | 257 | 15 | 38 | 56.11 | 40 | 45.68 | 20 | 53 | 20.1 | 59 | 35.4 | 9.06555 | 9.6023 | 3.30 | 4.30 |
| 14 | 4 | 7.4 | 258 | 15 | 41 | 43.98 | 43 | 34.44 | 21 | 2 | 52.8 | 9 | 4.0 | 9.06773 | 9.5957 | 3.30 | 4.32 |
| 15 | 4 | 6.3 | 259 | 15 | 44 | 32.70 | 46 | 24.05 | 21 | 12 | 17.2 | 18 | 23.9 | 9.06988 | 9.5889 | 3.29 | 4.33 |
| 16 | 4 | 5.2 | 260 | 15 | 47 | 22.26 | 49 | 14.49 | 21 | 21 | 33.0 | 27 | 34.7 | 9.07200 | 9.5819 | 3.29 | 4.35 |
| 17 | 4 | 4.1 | 261 | 15 | 50 | 12.65 | 52 | 5.75 | 21 | 30 | 39.6 | 36 | 36.1 | 9.07409 | 9.5747 | 3.29 | 4.36 |
| 18 | 4 | 3.0 | 262 | 15 | 53 | 3.85 | 54 | 57.83 | 21 | 39 | 36.8 | 45 | 28.1 | 9.07616 | 9.5672 | 3.29 | 4.37 |
| 19 | 4 | 2.0 | 263 | 15 | 55 | 55.87 | 57 | 50.74 | 21 | 48 | 24.5 | 54 | 10.5 | 9.07821 | 9.5594 | 3.28 | 4.38 |
| 20 | 4 | 1.0 | 264 | 15 | 58 | 48.70 | 0 | 44.45 | 21 | 57 | 2.6 | 2 | 42.7 | 9.08024 | 9.5513 | 3.28 | 4.39 |
| 21 | 4 | 0.0 | 265 | 16 | 1 | 42.34 | 3 | 38.97 | 22 | 5 | 30.5 | 11 | 4.6 | 9.08225 | 9.5428 | 3.27 | 4.40 |
| 22 | 3 | 59.0 | 266 | 16 | 4 | 36.78 | 6 | 34.29 | 22 | 13 | 48.0 | 19 | 16.1 | 9.08425 | 9.5340 | 3.27 | 4.41 |
| 23 | 3 | 58.0 | 267 | 16 | 7 | 32.01 | 9 | 30.40 | 22 | 21 | 55.2 | 27 | 17.2 | 9.08622 | 9.5248 | 3.27 | 4.42 |
| 24 | 3 | 57.0 | 268 | 16 | 10 | 28.02 | 12 | 27.32 | 22 | 29 | 51.9 | 35 | 7.5 | 9.08817 | 9.5152 | 3.26 | 4.42 |
| 25 | 3 | 56.0 | 269 | 16 | 13 | 24.83 | 15 | 25.04 | 22 | 37 | 37.8 | 42 | 46.9 | 9.09009 | 9.5052 | 3.26 | 4.43 |
| 26 | 3 | 55.0 | 270 | 16 | 16 | 22.43 | 18 | 23.53 | 22 | 45 | 12.7 | 50 | 14.9 | 9.09199 | 9.4948 | 3.25 | 4.43 |
| 27 | 3 | 54.1 | 271 | 16 | 19 | 20.80 | 21 | 22.80 | 22 | 52 | 36.2 | 57 | 31.5 | 9.09387 | 9.4841 | 3.25 | 4.44 |
| 28 | 3 | 53.1 | 272 | 16 | 22 | 19.94 | 24 | 22.83 | 22 | 59 | 48.3 | 4 | 36.9 | 9.09572 | 9.4729 | 3.24 | 4.45 |
| 29 | 3 | 52.2 | 273 | 16 | 25 | 19.84 | 27 | 23.61 | 23 | 6 | 49.2 | 11 | 31.0 | 9.09754 | 9.4611 | 3.24 | 4.45 |
| 30 | 3 | 51.3 | 274 | 16 | 28 | 20.49 | 30 | 25.14 | 23 | 13 | 38.8 | 18 | 13.8 | 9.09933 | 9.4487 | 3.23 | 4.46 |
| Oct. 1 | 3 | 50.4 | 275 | 16 | 31 | 21.86 | 33 | 27.40 | 23 | 20 | 17.0 | 24 | 45.0 | 9.10109 | 9.4357 | 3.23 | 4.46 |
| 2 | 3 | 49.5 | 276 | 16 | 34 | 23.96 | 36 | 30.39 | 23 | 26 | 43.6 | 31 | 4.1 | 9.10281 | 9.4221 | 3.22 | 4.47 |
| 3 | 3 | 48.6 | 277 | 16 | 37 | 26.78 | 39 | 34.09 | 23 | 32 | 58.1 | 37 | 11.0 | 9.10448 | 9.4079 | 3.21 | 4.48 |
| 4 | 3 | 47.7 | 278 | 16 | 40 | 30.30 | 42 | 38.46 | 23 | 39 | 0.4 | 43 | 5.4 | 9.10611 | 9.3932 | 3.20 | 4.49 |
| 5 | 3 | 46.8 | 279 | 16 | 43 | 34.49 | 45 | 43.50 | 23 | 44 | 50.2 | 48 | 47.1 | 9.10770 | 9.3777 | 3.19 | 4.49 |
| 6 | 3 | 46.0 | 280 | 16 | 46 | 39.34 | 48 | 49.21 | 23 | 50 | 27.4 | 54 | 15.8 | 9.10925 | 9.3614 | 3.18 | 4.50 |
| 7 | 3 | 45.2 | 281 | 16 | 49 | 44.85 | 51 | 55.57 | 23 | 55 | 51.6 | 59 | 31.4 | 9.11076 | 9.3439 | 3.17 | 4.51 |
| 8 | 3 | 44.4 | 282 | 16 | 52 | 51.00 | 55 | 2.55 | 24 | 1 | 2.7 | 4 | 33.8 | 9.11224 | 9.3254 | 3.16 | 4.51 |
| 9 | 3 | 43.6 | 283 | 16 | 55 | 57.76 | 58 | 10.15 | 24 | 6 | 0.6 | 9 | 22.7 | 9.11368 | 9.3059 | 3.15 | 4.52 |
| 10 | 3 | 42.8 | 284 | 16 | 59 | 5.13 | 1 | 18.38 | 24 | 10 | 45.0 | 13 | 57.9 | 9.11509 | 9.2852 | 3.14 | 4.52 |
| 11 | 3 | 42.0 | 285 | 17 | 2 | 13.12 | 4 | 27.22 | 24 | 15 | 15.7 | 18 | 19.2 | 9.11646 | 9.2632 | 3.13 | 4.53 |
| 12 | 3 | 41.2 | 286 | 17 | 5 | 21.70 | 7 | 36.64 | 24 | 19 | 32.5 | 22 | 26.5 | 9.11779 | 9.2392 | 3.12 | 4.53 |
| 13 | 3 | 40.4 | 287 | 17 | 8 | 30.86 | 10 | 46.64 | 24 | 23 | 35.3 | 26 | 19.7 | 9.11910 | 9.2146 | 3.11 | 4.53 |
| 14 | 3 | 39.6 | 288 | 17 | 11 | 40.60 | 13 | 57.20 | 24 | 27 | 24.0 | 29 | 58.7 | 9.12038 | 9.1877 | 3.10 | 4.54 |
| 15 | 3 | 38.8 | 289 | 17 | 14 | 50.89 | 17 | 8.31 | 24 | 30 | 58.5 | 33 | 23.4 | 9.12163 | 9.1591 | 3.09 | 4.54 |
| 16 | 3 | 38.1 | 290 | 17 | 18 | 1.73 | 20 | 19.95 | 24 | 34 | 18.7 | 36 | 33.7 | 9.12285 | 9.1278 | 3.08 | 4.55 |
| 17 | 3 | 37.4 | 291 | 17 | 21 | 13.09 | 23 | 32.11 | 24 | 37 | 24.5 | 39 | 29.6 | 9.12405 | 9.0940 | 3.07 | 4.55 |
| 18 | 3 | 36.7 | 292 | 17 | 24 | 24.96 | 26 | 44.75 | 24 | 40 | 15.9 | 42 | 11.0 | 9.12520 | 9.0568 | 3.06 | 4.56 |
| 19 | 3 | 35.9 | 293 | 17 | 27 | 37.31 | 29 | 57.87 | 24 | 42 | 52.8 | 44 | 37.7 | 9.12630 | 9.0162 | 3.05 | 4.56 |
| 20 | 3 | 35.2 | 294 | 17 | 30 | 50.13 | 33 | 11.45 | 24 | 45 | 15.0 | 46 | 49.5 | 9.12735 | 8.9711 | 3.03 | 4.56 |
| 21 | 3 | 34.5 | 295 | 17 | 34 | 3.40 | 36 | 25.47 | 24 | 47 | 22.4 | 48 | 46.3 | 9.12835 | 8.9203 | 3.02 | 4.57 |
| 22 | 3 | 33.8 | 296 | 17 | 37 | 17.11 | 39 | 39.93 | 24 | 49 | 14.9 | 50 | 27.8 | 9.12929 | 8.8624 | 3.01 | 4.57 |
| 23 | 3 | 33.1 | 297 | 17 | 40 | 31.25 | 42 | 54.81 | 24 | 50 | 52.1 | 51 | 53.9 | 9.13021 | 8.7942 | 2.99 | 4.57 |
| 24 | 3 | 32.4 | 298 | 17 | 43 | 45.80 | 46 | 10.08 | 24 | 52 | 14.0 | 53 | 4.7 | 9.13110 | 8.7131 | 2.97 | 4.57 |
| 25 | 3 | 31.7 | 299 | 17 | 47 | 0.73 | 49 | 25.72 | 24 | 53 | 20.6 | 54 | 0.1 | 9.13196 | 8.6120 | 2.95 | 4.58 |
| 26 | 3 | 31.1 | 300 | 17 | 50 | 16.03 | 52 | 41.75 | 24 | 54 | 11.8 | 54 | 39.8 | 9.13279 | 8.4819 | 2.92 | 4.58 |
| 27 | 3 | 30.4 | 301 | 17 | 53 | 31.71 | 55 | 58.15 | 24 | 54 | 47.4 | 55 | 3.7 | 9.13358 | 8.2876 | 2.90 | 4.58 |
| 28 | 3 | 29.7 | 302 | 17 | 56 | 47.76 | 59 | 14.90 | 24 | 55 | 7.3 | 55 | 11.9 | 9.13434 | −7.9268 | 2.87 | 4.58 |
| 29 | 3 | 29.1 | 303 | 18 | 0 | 4.14 | 2 | 31.98 | 24 | 55 | 11.5 | 55 | 4.2 | 9.13507 | +7.3967 | 2.85 | 4.58 |
| 30 | 3 | 28.4 | 304 | 18 | 3 | 20.85 | 5 | 49.38 | 24 | 55 | 0.0 | 54 | 40.7 | 9.13577 | 8.1260 | 2.82 | 4.58 |
| 31 | 3 | 27.8 | 305 | 18 | 6 | 37.87 | 9 | 7.08 | 24 | 54 | 32.6 | 54 | 1.3 | 9.13644 | 8.3882 | 2.79 | 4.58 |
| 32 | 3 | 27.1 | 306 | 18 | 9 | 55.18 | 12 | 25.04 | −24 | 53 | 49.4 | 53 | 6.0 | +9.13708 | +8.5505 | +2.76 | +4.58 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Nov. 1 3 27.1 | 306 | 18 9 55.18 | 12 25.04 | −24 53 49.4 | 53 6.0 | +9.13708 | +8.5505 | +2.76 | +4.58 |
| 2 3 26.5 | 307 | 18 13 12.74 | 15 43.24 | 24 52 50.3 | 51 54.7 | 9.13766 | 8.6671 | 2.71 | 4.58 |
| 3 3 25.8 | 308 | 18 16 30.55 | 19 1.65 | 24 51 35.3 | 50 27.2 | 9.13816 | 8.7610 | 2.66 | 4.58 |
| 4 3 25.2 | 309 | 18 19 48.55 | 22 20.25 | 24 50 4.2 | 48 43.6 | 9.13859 | 8.8378 | 2.60 | 4.59 |
| 5 3 24.6 | 310 | 18 23 6.74 | 25 39.03 | 24 48 17.0 | 46 43.9 | 9.13895 | 8.9030 | 2.53 | 4.59 |
| 6 3 24.0 | 311 | 18 26 25.10 | 28 57.97 | 24 46 13.8 | 44 28.1 | 9.13924 | 8.9597 | 2.42 | 4.59 |
| 7 3 23.4 | 312 | 18 29 43.61 | 32 17.03 | 24 43 54.5 | 41 56.1 | 9.13950 | 9.0101 | 2.31 | 4.59 |
| 8 3 22.8 | 313 | 18 33 2.24 | 35 36.18 | 24 41 19.1 | 39 7.9 | 9.13973 | 9.0547 | 2.20 | 4.59 |
| 9 3 22.2 | 314 | 18 36 20.95 | 38 55.42 | 24 38 27.6 | 36 3.4 | 9.13994 | 9.0962 | +2.08 | 4.59 |
| 10 3 21.6 | 315 | 18 39 39.75 | 42 14.73 | 24 35 20.0 | 32 42.6 | 9.14012 | 9.1356 | | 4.59 |
| 11 3 21.0 | 316 | 18 42 58.62 | 45 34.09 | 24 31 56.2 | 29 5.6 | 9.14027 | 9.1680 | | 4.59 |
| 12 3 20.4 | 317 | 18 46 17.53 | 48 53.49 | 24 28 16.2 | 25 12.4 | 9.14037 | 9.1995 | | 4.59 |
| 13 3 19.8 | 318 | 18 49 36.48 | 52 12.91 | 24 24 20.1 | 21 3.0 | 9.14043 | 9.2294 | | 4.59 |
| 14 3 19.1 | 319 | 18 52 55.44 | 55 32.34 | 24 20 7.8 | 16 37.5 | 9.14045 | 9.2570 | | 4.58 |
| 15 3 18.5 | 320 | 18 56 14.41 | 58 51.76 | 24 15 39.5 | 11 56.0 | 9.14042 | 9.2832 | | 4.58 |
| 16 3 17.9 | 321 | 18 59 33.37 | 2 11.15 | 24 10 55.2 | 6 58.5 | 9.14035 | 9.3073 | −2.08 | 4.58 |
| 17 3 17.3 | 322 | 19 2 52.30 | 5 30.51 | 24 5 55.0 | 1 44.9 | 9.14025 | 9.3305 | 2.22 | 4.58 |
| 18 3 16.7 | 323 | 19 6 11.18 | 8 49.82 | 24 0 38.8 | 56 15.3 | 9.14013 | 9.3523 | 2.33 | 4.58 |
| 19 3 16.0 | 324 | 19 9 30.01 | 12 9.05 | 23 55 6.7 | 50 29.8 | 9.13999 | 9.3732 | 2.38 | 4.58 |
| 20 3 15.4 | 325 | 19 12 48.76 | 15 28.18 | 23 49 18.8 | 44 28.4 | 9.13982 | 9.3927 | 2.42 | 4.58 |
| 21 3 14.8 | 326 | 19 16 7.41 | 18 47.22 | 23 43 15.2 | 38 11.2 | 9.13963 | 9.4116 | 2.51 | 4.58 |
| 22 3 14.2 | 327 | 19 19 25.97 | 22 6.15 | 23 36 55.9 | 31 38.2 | 9.13941 | 9.4295 | 2.58 | 4.58 |
| 23 3 13.5 | 328 | 19 22 44.42 | 25 24.94 | 23 30 20.8 | 24 49.5 | 9.13915 | 9.4468 | 2.61 | 4.58 |
| 24 3 12.9 | 329 | 19 26 2.73 | 28 43.57 | 23 23 30.1 | 17 45.1 | 9.13885 | 9.4632 | 2.64 | 4.57 |
| 25 3 12.2 | 330 | 19 29 20.88 | 32 2.04 | 23 16 23.7 | 10 25.2 | 9.13851 | 9.4793 | 2.68 | 4.57 |
| 26 3 11.6 | 331 | 19 32 38.87 | 35 20.33 | 23 9 1.8 | 2 49.7 | 9.13813 | 9.4944 | 2.71 | 4.57 |
| 27 3 11.0 | 332 | 19 35 56.68 | 38 38.43 | 23 1 24.4 | 54 58.6 | 9.13772 | 9.5092 | 2.74 | 4.57 |
| 28 3 10.3 | 333 | 19 39 14.29 | 41 56.32 | 22 53 31.5 | 46 51.9 | 9.13727 | 9.5235 | 2.77 | 4.56 |
| 29 3 9.7 | 334 | 19 42 31.69 | 45 14.00 | 22 45 23.1 | 38 29.7 | 9.13679 | 9.5371 | 2.80 | 4.56 |
| 30 3 9.0 | 335 | 19 45 48.88 | 48 31.46 | 22 36 59.3 | 29 52.2 | 9.13628 | 9.5504 | 2.83 | 4.55 |
| Dec. 1 3 8.4 | 336 | 19 49 5.85 | 51 48.66 | 22 28 20.4 | 20 59.6 | 9.13574 | 9.5630 | 2.86 | 4.55 |
| 2 3 7.7 | 337 | 19 52 22.55 | 55 5.56 | 22 19 26.5 | 11 52.2 | 9.13514 | 9.5751 | 2.87 | 4.55 |
| 3 3 7.0 | 338 | 19 55 38.95 | 58 22.17 | 22 10 17.8 | 2 30.0 | 9.13451 | 9.5868 | 2.88 | 4.54 |
| 4 3 6.4 | 339 | 19 58 55.06 | 1 38.48 | 22 0 54.4 | 52 53.0 | 9.13384 | 9.5981 | 2.88 | 4.54 |
| 5 3 5.7 | 340 | 20 2 10.87 | 4 54.47 | 21 51 16.3 | 43 1.7 | 9.13314 | 9.6089 | 2.89 | 4.53 |
| 6 3 5.0 | 341 | 20 5 26.36 | 8 10.15 | 21 41 24.0 | 32 56.3 | 9.13242 | 9.6193 | 2.90 | 4.53 |
| 7 3 4.3 | 342 | 20 8 41.54 | 11 25.49 | 21 31 17.7 | 22 36.7 | 9.13168 | 9.6294 | 2.91 | 4.52 |
| 8 3 3.6 | 343 | 20 11 56.39 | 14 40.49 | 21 20 57.3 | 12 3.1 | 9.13092 | 9.6391 | 2.92 | 4.52 |
| 9 3 2.9 | 344 | 20 15 10.90 | 17 55.13 | 21 10 23.0 | 1 15.8 | 9.13014 | 9.6485 | 2.94 | 4.51 |
| 10 3 2.2 | 345 | 20 18 25.05 | 21 9.39 | 20 59 35.1 | 50 15.1 | 9.12934 | 9.6576 | 2.95 | 4.50 |
| 11 3 1.5 | 346 | 20 21 38.82 | 24 23.28 | 20 48 33.8 | 39 1.0 | 9.12852 | 9.6664 | 2.96 | 4.50 |
| 12 3 0.8 | 347 | 20 24 52.22 | 27 36.79 | 20 37 19.2 | 27 33.7 | 9.12768 | 9.6749 | 2.97 | 4.49 |
| 13 3 0.1 | 348 | 20 28 5.24 | 30 49.92 | 20 25 51.5 | 15 53.3 | 9.12682 | 9.6832 | 2.98 | 4.49 |
| 14 2 59.3 | 349 | 20 31 17.87 | 34 2.65 | 20 14 10.6 | 3 59.8 | 9.12594 | 9.6913 | 2.98 | 4.48 |
| 15 2 58.6 | 350 | 20 34 30.14 | 37 14.98 | 20 2 16.8 | 51 53.4 | 9.12505 | 9.6991 | 2.99 | 4.48 |
| 16 2 57.9 | 351 | 20 37 41.97 | 40 26.91 | 19 50 10.2 | 39 34.3 | 9.12414 | 9.7067 | 3.00 | 4.48 |
| 17 2 57.1 | 352 | 20 40 53.42 | 43 38.43 | 19 37 51.0 | 27 2.5 | 9.12322 | 9.7141 | 3.00 | 4.47 |
| 18 2 56.4 | 353 | 20 44 4.46 | 46 49.53 | 19 25 19.3 | 14 18.3 | 9.12229 | 9.7213 | 3.00 | 4.47 |
| 19 2 55.6 | 354 | 20 47 15.08 | 50 0.22 | 19 12 35.1 | 1 21.9 | 9.12136 | 9.7283 | 3.00 | 4.46 |
| 20 2 54.9 | 355 | 20 50 25.29 | 53 10.49 | 18 59 38.8 | 48 13.3 | 9.12042 | 9.7351 | 3.00 | 4.46 |
| 21 2 54.1 | 356 | 20 53 35.09 | 56 20.34 | 18 46 30.4 | 34 42.9 | 9.11947 | 9.7416 | 3.00 | 4.45 |
| 22 2 53.3 | 357 | 20 56 44.47 | 59 29.78 | 18 33 10.2 | 21 20.6 | 9.11850 | 9.7480 | 3.00 | 4.44 |
| 23 2 52.5 | 358 | 20 59 53.44 | 2 38.79 | 18 19 38.2 | 7 36.8 | 9.11752 | 9.7542 | 3.00 | 4.43 |
| 24 2 51.7 | 359 | 21 3 1.98 | 5 47.36 | 18 5 54.8 | 53 41.6 | 9.11653 | 9.7602 | 3.01 | 4.43 |
| 25 2 50.9 | 360 | 21 6 10.09 | 8 55.49 | 17 52 0.1 | 39 35.4 | 9.11553 | 9.7660 | 3.01 | 4.42 |
| 26 2 50.1 | 361 | 21 9 17.76 | 12 3.19 | 17 37 54.4 | 25 18.3 | 9.11452 | 9.7717 | 3.01 | 4.41 |
| 27 2 49.3 | 362 | 21 12 25.00 | 15 10.46 | 17 23 37.8 | 10 50.3 | 9.11351 | 9.7772 | 3.01 | 4.40 |
| 28 2 48.4 | 363 | 21 15 31.82 | 18 17.30 | 17 9 10.5 | 56 11.8 | 9.11251 | 9.7825 | 3.02 | 4.39 |
| 29 2 47.6 | 364 | 21 18 38.21 | 21 23.71 | 16 54 32.7 | 41 23.3 | 9.11152 | 9.7876 | 3.02 | 4.38 |
| 30 2 46.7 | 365 | 21 21 44.17 | 24 29.68 | 16 39 45.0 | 26 24.9 | 9.11054 | 9.7925 | 3.03 | 4.37 |
| 31 2 45.9 | 366 | 21 24 49.70 | 27 35.20 | 16 24 47.5 | 11 17.0 | 9.10957 | 9.7971 | 3.03 | 4.36 |
| 32 2 45.0 | 367 | 21 27 54.78 | 30 40.27 | −16 9 40.6 | 56 0.0 | +9.10861 | +9.8014 | −3.03 | +4.35 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$ in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Jan. 0 3 33.8 | 0 | 22 12 40.42 | 12 37.12 | −12 10 56.3 | 11 15.5 | +8.4869 | +9.2423 | +2.92 | +3.75 |
| 1 3 30.7 | 1 | 22 13 24.79 | 13 21.49 | 12 6 43.6 | 7 2.7 | 8.4903 | 9.2463 | 2.91 | 3.74 |
| 2 3 27.6 | 2 | 22 14 9.50 | 14 6.20 | 12 2 28.5 | 2 47.5 | 8.4936 | 9.2502 | 2.90 | 3.74 |
| 3 3 24.4 | 3 | 22 14 54.53 | 14 51.23 | 11 58 11.1 | 58 30.1 | 8.4968 | 9.2540 | 2.89 | 3.73 |
| 4 3 21.2 | 4 | 22 15 39.89 | 15 36.59 | 11 53 51.5 | 54 10.5 | 8.4999 | 9.2577 | 2.88 | 3.73 |
| 5 3 18.0 | 5 | 22 16 25.57 | 16 22.27 | 11 49 29.7 | 49 48.6 | 8.5029 | 9.2614 | 2.87 | 3.73 |
| 6 3 14.8 | 6 | 22 17 11.56 | 17 8.26 | 11 45 5.7 | 45 24.6 | 8.5058 | 9.2650 | 2.86 | 3.72 |
| 7 3 11.6 | 7 | 22 17 57.85 | 17 54.55 | 11 40 39.6 | 40 58.5 | 8.5086 | 9.2686 | 2.85 | 3.71 |
| 8 3 8.4 | 8 | 22 18 44.44 | 18 41.14 | 11 36 11.3 | 36 30.2 | 8.5113 | 9.2720 | 2.84 | 3.70 |
| 9 3 5.3 | 9 | 22 19 31.32 | 19 28.03 | 11 31 40.9 | 31 59.8 | 8.5140 | 9.2754 | 2.83 | 3.69 |
| 10 3 2.1 | 10 | 22 20 18.48 | 20 15.20 | 11 27 8.3 | 27 27.3 | 8.5166 | 9.2786 | 2.82 | 3.68 |
| 11 2 58.9 | 11 | 22 21 5.91 | 21 2.65 | 11 22 34.0 | 22 52.9 | 8.5191 | 9.2817 | 2.81 | 3.67 |
| 12 2 55.8 | 12 | 22 21 53.61 | 21 50.36 | 11 17 57.6 | 18 16.5 | 8.5215 | 9.2847 | 2.80 | 3.66 |
| 13 2 52.7 | 13 | 22 22 41.58 | 22 38.33 | 11 13 19.2 | 13 38.1 | 8.5238 | 9.2877 | 2.78 | 3.65 |
| 14 2 49.5 | 14 | 22 23 29.80 | 23 26.56 | 11 8 38.9 | 8 57.8 | 8.5260 | 9.2906 | 2.77 | 3.64 |
| 15 2 46.4 | 15 | 22 24 18.26 | 24 15.04 | 11 3 56.8 | 4 15.6 | 8.5282 | 9.2935 | 2.76 | 3.63 |
| 16 2 43.3 | 16 | 22 25 6.96 | 25 3.75 | 10 59 12.8 | 59 31.6 | 8.5303 | 9.2963 | 2.75 | 3.63 |
| 17 2 40.2 | 17 | 22 25 55.89 | 25 52.69 | 10 54 27.0 | 54 45.8 | 8.5323 | 9.2990 | 2.74 | 3.62 |
| 18 2 37.1 | 18 | 22 26 45.05 | 26 41.86 | 10 49 39.5 | 49 58.2 | 8.5343 | 9.3017 | 2.73 | 3.61 |
| 19 2 34.0 | 19 | 22 27 34.43 | 27 31.25 | 10 44 50.2 | 45 8.9 | 8.5362 | 9.3043 | 2.72 | 3.60 |
| 20 2 30.9 | 20 | 22 28 24.02 | 28 20.86 | 10 39 59.2 | 40 17.8 | 8.5381 | 9.3069 | 2.71 | 3.59 |
| 21 2 27.8 | 21 | 22 29 13.82 | 29 10.68 | 10 35 6.5 | 35 25.0 | 8.5399 | 9.3094 | 2.69 | 3.59 |
| 22 2 24.7 | 22 | 22 30 3.83 | 30 0.71 | 10 30 12.1 | 30 30.6 | 8.5417 | 9.3118 | 2.68 | 3.58 |
| 23 2 21.6 | 23 | 22 30 54.04 | 30 50.93 | 10 25 16.1 | 25 34.5 | 8.5434 | 9.3142 | 2.67 | 3.58 |
| 24 2 18.5 | 24 | 22 31 44.44 | 31 41.35 | 10 20 18.5 | 20 36.8 | 8.5450 | 9.3165 | 2.66 | 3.57 |
| 25 2 15.4 | 25 | 22 32 35.03 | 32 31.96 | 10 15 19.4 | 15 37.6 | 8.5466 | 9.3187 | 2.65 | 3.57 |
| 26 2 12.3 | 26 | 22 33 25.80 | 33 22.75 | 10 10 18.8 | 10 36.8 | 8.5481 | 9.3208 | 2.63 | 3.56 |
| 27 2 9.2 | 27 | 22 34 16.75 | 34 13.72 | 10 5 16.6 | 5 34.6 | 8.5496 | 9.3229 | 2.62 | 3.56 |
| 28 2 6.1 | 28 | 22 35 7.88 | 35 4.86 | 10 0 13.0 | 0 30.9 | 8.5510 | 9.3250 | 2.61 | 3.55 |
| 29 2 3.1 | 29 | 22 35 59.17 | 35 56.17 | 9 55 7.9 | 55 25.7 | 8.5524 | 9.3270 | 2.59 | 3.54 |
| 30 2 0.0 | 30 | 22 36 50.62 | 36 47.65 | 9 50 1.4 | 50 19.1 | 8.5537 | 9.3290 | 2.58 | 3.53 |
| 31 1 56.9 | 31 | 22 37 42.23 | 37 39.28 | 9 44 53.5 | 45 11.1 | 8.5550 | 9.3310 | 2.56 | 3.52 |
| Feb. 1 1 53.8 | 32 | 22 38 33.99 | 38 31.06 | 9 39 44.2 | 40 1.7 | 8.5562 | 9.3329 | 2.55 | 3.51 |
| 2 1 50.8 | 33 | 22 39 25.90 | 39 22.99 | 9 34 33.6 | 34 51.0 | 8.5574 | 9.3348 | 2.53 | 3.50 |
| 3 1 47.7 | 34 | 22 40 17.95 | 40 15.06 | 9 29 21.7 | 29 38.9 | 8.5585 | 9.3366 | 2.51 | 3.48 |
| 4 1 44.6 | 35 | 22 41 10.13 | 41 7.27 | 9 24 8.5 | 24 25.6 | 8.5596 | 9.3384 | 2.49 | 3.47 |
| 5 1 41.5 | 36 | 22 42 2.44 | 41 59.60 | 9 18 54.0 | 19 11.0 | 8.5607 | 9.3401 | 2.47 | 3.45 |
| 6 1 38.5 | 37 | 22 42 54.87 | 42 52.06 | 9 13 38.4 | 13 55.3 | 8.5617 | 9.3417 | 2.45 | 3.43 |
| 7 1 35.4 | 38 | 22 43 47.42 | 43 44.64 | 9 8 21.6 | 8 38.4 | 8.5627 | 9.3432 | 2.43 | 3.42 |
| 8 1 32.3 | 39 | 22 44 40.08 | 44 37.33 | 9 3 3.7 | 3 20.4 | 8.5636 | 9.3447 | 2.41 | 3.40 |
| 9 1 29.3 | 40 | 22 45 32.85 | 45 30.12 | 8 57 44.8 | 58 1.3 | 8.5644 | 9.3461 | 2.38 | 3.39 |
| 10 1 26.3 | 41 | 22 46 25.72 | 46 23.01 | 8 52 24.8 | 52 41.2 | 8.5652 | 9.3475 | 2.35 | 3.38 |
| 11 1 23.2 | 42 | 22 47 18.68 | 47 15.99 | 8 47 3.8 | 47 20.1 | 8.5659 | 9.3489 | 2.32 | 3.36 |
| 12 1 20.2 | 43 | 22 48 11.73 | 48 9.06 | 8 41 41.9 | 41 58.0 | 8.5666 | 9.3502 | 2.29 | 3.35 |
| 13 1 17.1 | 44 | 22 49 4.86 | 49 2.22 | 8 36 19.0 | 36 35.0 | 8.5672 | 9.3514 | 2.26 | 3.33 |
| 14 1 14.1 | 45 | 22 49 58.06 | 49 55.46 | 8 30 55.3 | 31 11.1 | 8.5678 | 9.3526 | 2.23 | 3.31 |
| 15 1 11.0 | 46 | 22 50 51.33 | 50 48.77 | 8 25 30.7 | 25 46.3 | 8.5684 | 9.3536 | 2.20 | 3.30 |
| 16 1 8.0 | 47 | 22 51 44.67 | 51 42.15 | 8 20 5.3 | 20 20.7 | 8.5689 | 9.3546 | 2.17 | 3.28 |
| 17 1 4.9 | 48 | 22 52 38.07 | 52 35.59 | 8 14 39.1 | 14 54.3 | 8.5694 | 9.3556 | 2.14 | 3.27 |
| 18 1 1.9 | 49 | 22 53 31.53 | 53 29.08 | 8 9 12.1 | 9 27.2 | 8.5699 | 9.3565 | 2.11 | 3.25 |
| 19 0 58.8 | 50 | 22 54 25.05 | 54 22.63 | 8 3 44.4 | 3 59.3 | 8.5703 | 9.3575 | 2.08 | 3.23 |
| 20 0 55.8 | 51 | 22 55 18.62 | 55 16.22 | 7 58 16.0 | 58 30.8 | 8.5707 | 9.3584 | 2.05 | 3.21 |
| 21 0 52.7 | 52 | 22 56 12.24 | 56 9.86 | 7 52 47.0 | 53 1.6 | 8 5711 | 9.3593 | 2.02 | 3.19 |
| 22 0 49.7 | 53 | 22 57 5.90 | 57 3.55 | 7 47 17.3 | 47 31.7 | 8.5714 | 9.3602 | 1.98 | 3.16 |
| 23 0 46.7 | 54 | 22 57 59.60 | 57 57.27 | 7 41 47.0 | 42 1.2 | 8.5717 | 9.3610 | 1.93 | 3.14 |
| 24 0 43.6 | 55 | 22 58 53.33 | 58 51.03 | 7 36 16.1 | 36 30.2 | 8.5720 | 9.3617 | 1.87 | 3.12 |
| 25 0 40.6 | 56 | 22 59 47.09 | 59 44.82 | 7 30 44.7 | 30 58.6 | 8.5722 | 9.3624 | 1.80 | 3.10 |
| 26 0 37.6 | 57 | 23 0 40.87 | 0 38.64 | 7 25 12.8 | 25 26.5 | 8.5724 | 9.3630 | +1.71 | 3.07 |
| 27 0 34.5 | 58 | 23 1 34.67 | 1 32.48 | 7 19 40.4 | 19 53.9 | 8.5725 | 9.3636 |  | 3.05 |
| 28 0 31.5 | 59 | 23 2 28.49 | 2 26.33 | 7 14 7.6 | 14 20.9 | 8.5726 | 9.3642 |  | 3.03 |
| 29 0 28.4 | 60 | 23 3 22.32 | 3 20.20 | 7 8 34.3 | 8 47.4 | 8.5727 | 9.3647 |  | 3.00 |
| 30 0 25.4 | 61 | 23 4 16.16 | 4 14.07 | − 7 3 0.6 | 3 13.5 | +8.5727 | +9.3652 |  | +2.96 |

NOTE.—The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Mar. 1 0 25.4 | 61 | 23 4 16.16 | 4 14.07 | − 7 3 0.6 | 3 13.5 | +8.5727 | +9.3652 | | +2.96 |
| 2 0 22.4 | 62 | 23 5 10.00 | 5 7.95 | 6 57 26.5 | 57 39.2 | 8.5727 | 9.3657 | | 2.89 |
| 3 0 19.3 | 63 | 23 6 3.84 | 6 1.82 | 6 51 52.2 | 52 4.7 | 8.5727 | 9.3661 | | 2.80 |
| 4 0 16.3 | 64 | 23 6 57.67 | 6 55.69 | 6 46 17.6 | 46 29.9 | 8.5726 | 9.3665 | | 2.69 |
| 5 0 13.3 | 65 | 23 7 51.49 | 7 49.55 | 6 40 42.7 | 40 54.8 | 8.5725 | 9.3668 | −1.67 | +2.56 |
| 6 0 10.3 | 66 | 23 8 45.30 | 8 43.39 | 6 35 7.6 | 35 19.5 | 8.5724 | 9.3670 | 1.75 | |
| 7 0 7.2 | 67 | 23 9 39.09 | 9 37.21 | 6 29 32.3 | 29 44.1 | 8.5722 | 9.3671 | 1.83 | |
| 8 0 4.2 | 68 | 23 10 32.85 | 10 31.00 | 6 23 57.0 | 24 8.5 | 8.5720 | 9.3672 | 1.90 | |
| 9 0 1.2 | 69 | 23 11 26.58 | 11 24.76 | 6 18 21.6 | 18 32.9 | 8.5717 | 9.3672 | 1.96 | |
| 9 23 58.1 | 70 | 23 12 20.27 | 12 18.48 | 6 12 46.2 | 12 57.2 | 8.5714 | 9.3672 | 2.01 | |
| 10 23 55.1 | 71 | 23 13 13.92 | 13 12.16 | 6 7 10.8 | 7 21.6 | 8.5710 | 9.3672 | 2.06 | |
| 11 23 52.0 | 72 | 23 14 7.52 | 14 5.80 | 6 1 35.4 | 1 46.1 | 8.5706 | 9.3671 | 2.10 | |
| 12 23 49.0 | 73 | 23 15 1.07 | 14 59.39 | 5 56 0.1 | 56 10.6 | 8.5702 | 9.3670 | 2.14 | |
| 13 23 45.9 | 74 | 23 15 54.57 | 15 52.93 | 5 50 24.9 | 50 35.1 | 8.5698 | 9.3670 | 2.17 | |
| 14 23 42.9 | 75 | 23 16 48.01 | 16 46.41 | 5 44 49.8 | 44 59.8 | 8.5693 | 9.3669 | 2.19 | |
| 15 23 39.8 | 76 | 23 17 41.39 | 17 39.82 | 5 39 14.9 | 39 24.7 | 8.5688 | 9.3668 | 2.22 | |
| 16 23 36.8 | 77 | 23 18 34.70 | 18 33.16 | 5 33 40.2 | 33 49.8 | 8.5682 | 9.3667 | 2.24 | −2.73 |
| 17 23 33.7 | 78 | 23 19 27.94 | 19 26.43 | 5 28 5.8 | 28 15.2 | 8.5676 | 9.3664 | 2.26 | 2.80 |
| 18 23 30.6 | 79 | 23 20 21.10 | 20 19.62 | 5 22 31.6 | 22 40.8 | 8.5670 | 9.3661 | 2.28 | 2.86 |
| 19 23 27.6 | 80 | 23 21 14.18 | 21 12.74 | 5 16 57.7 | 17 6.8 | 8.5663 | 9.3656 | 2.30 | 2.92 |
| 20 23 24.5 | 81 | 23 22 7.18 | 22 5.78 | 5 11 24 2 | 11 33.1 | 8.5656 | 9.3651 | 2.32 | 2.97 |
| 21 23 21.5 | 82 | 23 23 0.10 | 22 58.73 | 5 5 51.0 | 5 59.7 | 8.5649 | 9.3645 | 2.33 | 3.01 |
| 22 23 18.4 | 83 | 23 23 52.93 | 23 51.59 | 5 0 18.3 | 0 26.7 | 8.5642 | 9.3638 | 2 35 | 3.04 |
| 23 23 15.4 | 84 | 23 24 45.66 | 24 44.36 | 4 54 46.0 | 54 54.1 | 8.5634 | 9.3631 | 2.36 | 3.06 |
| 24 23 12.3 | 85 | 23 25 38.30 | 25 37.04 | 4 49 14.1 | 49 22.0 | 8.5626 | 9.3624 | 2.37 | 3.08 |
| 25 23 9.3 | 86 | 23 26 30.84 | 26 29.62 | 4 43 42.7 | 43 50.4 | 8.5617 | 9.3617 | 2.39 | 3.10 |
| 26 23 6.2 | 87 | 23 27 23.28 | 27 22.10 | 4 38 11.8 | 38 19.3 | 8.5608 | 9.3610 | 2.40 | 3.13 |
| 27 23 3.2 | 88 | 23 28 15.61 | 28 14.47 | 4 32 41.5 | 32 48.7 | 8.5599 | 9.3602 | 2.42 | 3.15 |
| 28 23 0.1 | 89 | 23 29 7.83 | 29 6.73 | 4 27 11.8 | 27 18.8 | 8.5590 | 9.3594 | 2.44 | 3.18 |
| 29 22 57.1 | 90 | 23 29 59.94 | 29 58.86 | 4 21 42.7 | 21 49.5 | 8.5580 | 9.3585 | 2.46 | 3.21 |
| 30 22 54.0 | 91 | 23 30 51.93 | 30 50.87 | 4 16 14.3 | 16 20.9 | 8.5570 | 9.3576 | 2.48 | 3.24 |
| 31 22 50.9 | 92 | 23 31 43.79 | 31 42.76 | 4 10 46.6 | 10 53.0 | 8.5559 | 9.3567 | 2.50 | 3.27 |
| Apr. 1 22 47.9 | 93 | 23 32 35.51 | 32 34.52 | 4 5 19.6 | 5 25.8 | 8.5548 | 9.3557 | 2.52 | 3.29 |
| 2 22 44.8 | 94 | 23 33 27.10 | 33 26.15 | 3 59 53.4 | 59 59.4 | 8.5537 | 9.3547 | 2.54 | 3.32 |
| 3 22 41.8 | 95 | 23 34 18.55 | 34 17.64 | 3 54 28.0 | 54 33.8 | 8.5525 | 9.3536 | 2.55 | 3.34 |
| 4 22 38.7 | 96 | 23 35 9.86 | 35 8.98 | 3 49 3.5 | 49 9.1 | 8.5513 | 9.3524 | 2 57 | 3.36 |
| 5 22 35.6 | 97 | 23 36 1.02 | 36 0.17 | 3 43 39.9 | 43 45.3 | 8.5500 | 9.3511 | 2.58 | 3.38 |
| 6 22 32.5 | 98 | 23 36 52.02 | 36 51.20 | 3 38 17.2 | 38 22.4 | 8.5486 | 9.3498 | 2.59 | 3.39 |
| 7 22 29.4 | 99 | 23 37 42.86 | 37 42.07 | 3 32 55.5 | 33 0.5 | 8.5471 | 9.3484 | 2.60 | 3.40 |
| 8 22 26.3 | 100 | 23 38 33.53 | 38 32.78 | 3 27 34.9 | 27 39.7 | 8.5456 | 9.3469 | 2.61 | 3.41 |
| 9 22 23.2 | 101 | 23 39 24.04 | 39 23.32 | 3 22 15.4 | 22 19.9 | 8.5441 | 9.3454 | 2.62 | 3.42 |
| 10 22 20.1 | 102 | 23 40 14.37 | 40 13.68 | 3 16 57.0 | 17 1.3 | 8.5426 | 9.3438 | 2.63 | 3.43 |
| 11 22 17.0 | 103 | 23 41 4.53 | 41 3.87 | 3 11 39.7 | 11 43.8 | 8.5411 | 9.3423 | 2.64 | 3.45 |
| 12 22 13.9 | 104 | 23 41 54.50 | 41 53.87 | 3 6 23.6 | 6 27.5 | 8.5395 | 9.3407 | 2.65 | 3.46 |
| 13 22 10.8 | 105 | 23 42 44.28 | 42 43.69 | 3 1 8.7 | 1 12.4 | 8.5379 | 9.3390 | 2.66 | 3.47 |
| 14 22 7.7 | 106 | 23 43 33.88 | 43 33.31 | 2 55 55.0 | 55 58.5 | 8.5363 | 9.3373 | 2.66 | 3.48 |
| 15 22 4.6 | 107 | 23 44 23.28 | 44 22.74 | 2 50 42.6 | 50 45.8 | 8.5346 | 9.3355 | 2.67 | 3.49 |
| 16 22 1.5 | 108 | 23 45 12.49 | 45 11.98 | 2 45 31.4 | 45 34.5 | 8.5328 | 9.3336 | 2.68 | 3.50 |
| 17 21 58.4 | 109 | 23 46 1.50 | 46 1.02 | 2 40 21.6 | 40 24.5 | 8.5310 | 9.3317 | 2.69 | 3.51 |
| 18 21 55.2 | 110 | 23 46 50.30 | 46 49.85 | 2 35 13.1 | 35 15.9 | 8.5292 | 9.3298 | 2.70 | 3.52 |
| 19 21 52.1 | 111 | 23 47 38.90 | 47 38.47 | 2 30 6.0 | 30 8.7 | 8.5273 | 9.3278 | 2.71 | 3.53 |
| 20 21 49.0 | 112 | 23 48 27.28 | 48 26.88 | 2 25 0.4 | 25 2.9 | 8.5254 | 9.3257 | 2.72 | 3.54 |
| 21 21 45.9 | 113 | 23 49 15.45 | 49 15.08 | 2 19 56.2 | 19 58.5 | 8.5234 | 9.3236 | 2.73 | 3.55 |
| 22 21 42.7 | 114 | 23 50 3.39 | 50 3.06 | 2 14 53.5 | 14 55.6 | 8.5214 | 9.3215 | 2.73 | 3.56 |
| 23 21 39.6 | 115 | 23 50 51.11 | 50 50.81 | 2 9 52.3 | 9 54.2 | 8.5193 | 9.3193 | 2.74 | 3.58 |
| 24 21 36.4 | 116 | 23 51 38.60 | 51 38.33 | 2 4 52.7 | 4 54.4 | 8.5172 | 9.3171 | 2.75 | 3.59 |
| 25 21 33.3 | 117 | 23 52 25.86 | 52 25.61 | 1 59 54.6 | 59 56.2 | 8.5150 | 9.3148 | 2.76 | 3.60 |
| 26 21 30.1 | 118 | 23 53 12.88 | 53 12.65 | 1 54 58.2 | 54 59.6 | 8.5128 | 9.3124 | 2.77 | 3.61 |
| 27 21 27.0 | 119 | 23 53 59.66 | 53 59.45 | 1 50 3.4 | 50 4.7 | 8.5105 | 9.3099 | 2.78 | 3.63 |
| 28 21 23.8 | 120 | 23 54 46.18 | 54 46.00 | 1 45 10.4 | 45 11.5 | 8.5082 | 9.3073 | 2.79 | 3.64 |
| 29 21 20.7 | 121 | 23 55 32.45 | 55 32.30 | 1 40 19.2 | 40 20.1 | 8.5058 | 9.3046 | 2.80 | 3.65 |
| 30 21 17.5 | 122 | 23 56 18.46 | 56 18.34 | − 1 35 29.7 | 35 30.5 | +8.5033 | +9.3019 | −2.81 | −3.66 |

**Note.** — The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Side-real Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ″ | | | | |
| May 1 21 14.4 | 123 | 23 57 4.21 | 57 4.11 | − 1 30 42.0 | 30 42.7 | +8.5008 | +9.2990 | −2.82 | −3.66 |
| 2 21 11.2 | 124 | 23 57 49.68 | 57 49.61 | 1 25 56.3 | 25 56.8 | 8.4982 | 9.2960 | 2.83 | 3.67 |
| 3 21 8.0 | 125 | 23 58 34.88 | 58 34.83 | 1 21 12.5 | 21 12.8 | 8.4955 | 9.2930 | 2.84 | 3.68 |
| 4 21 4.8 | 126 | 23 59 19.79 | 59 19.77 | 1 16 30.7 | 16 30.8 | 8.4927 | 9.2899 | 2.85 | 3.68 |
| 5 21 1.6 | 127 | 0 0 4.42 | 0 4.42 | 1 11 50.9 | 11 50.8 | 8.4898 | 9.2868 | 2.86 | 3.69 |
| 6 20 58.4 | 128 | 0 0 48.75 | 0 48.78 | 1 7 13.2 | 7 12.9 | 8.4869 | 9.2836 | 2.86 | 3.70 |
| 7 20 55.2 | 129 | 0 1 32.79 | 1 32.84 | 1 2 37.5 | 2 37.1 | 8.4839 | 9.2803 | 2.87 | 3.70 |
| 8 20 52.0 | 130 | 0 2 16.52 | 2 16.59 | 0 58 3.9 | 58 3.4 | 8.4808 | 9.2770 | 2.87 | 3.71 |
| 9 20 48.8 | 131 | 0 2 59.94 | 3 0.03 | 0 53 32.5 | 53 31.9 | 8.4777 | 9.2736 | 2.88 | 3.72 |
| 10 20 45.6 | 132 | 0 3 43.05 | 3 43.16 | 0 49 3.2 | 49 2.5 | 8.4745 | 9.2701 | 2.88 | 3.72 |
| 11 20 42.4 | 133 | 0 4 25.84 | 4 25.97 | 0 44 36.2 | 44 35.3 | 8.4713 | 9.2664 | 2.89 | 3.73 |
| 12 20 39.1 | 134 | 0 5 8.30 | 5 8.45 | 0 40 11.4 | 40 10.4 | 8.4680 | 9.2627 | 2.89 | 3.74 |
| 13 20 35.9 | 135 | 0 5 50.44 | 5 50.61 | 0 35 48.9 | 35 47.8 | 8.4646 | 9.2588 | 2.90 | 3.74 |
| 14 20 32.7 | 136 | 0 6 32.25 | 6 32.43 | 0 31 28.8 | 31 27.5 | 8.4612 | 9.2548 | 2.91 | 3.75 |
| 15 20 29.5 | 137 | 0 7 13.72 | 7 13.92 | 0 27 11.0 | 27 9.6 | 8.4576 | 9.2507 | 2.91 | 3.75 |
| 16 20 26.2 | 138 | 0 7 54.85 | 7 55.07 | 0 22 55.6 | 22 54.2 | 8.4540 | 9.2466 | 2.92 | 3.76 |
| 17 20 23.0 | 139 | 0 8 35.63 | 8 35.87 | 0 18 42.7 | 18 41.2 | 8.4503 | 9.2424 | 2.93 | 3.76 |
| 18 20 19.7 | 140 | 0 9 16.07 | 9 16.32 | 0 14 32.2 | 14 30.7 | 8.4466 | 9.2381 | 2.93 | 3.77 |
| 19 20 16.4 | 141 | 0 9 56.15 | 9 56.42 | 0 10 24.2 | 10 22.6 | 8.4427 | 9.2337 | 2.94 | 3.77 |
| 20 20 13.1 | 142 | 0 10 35.87 | 10 36.15 | 0 6 18.7 | 6 17.0 | 8.4387 | 9.2293 | 2.94 | 3.78 |
| 21 20 9.9 | 143 | 0 11 15.22 | 11 15.52 | − 0 2 15.8 | 2 13.9 | 8.4346 | 9.2247 | 2.95 | 3.79 |
| 22 20 6.6 | 144 | 0 11 54.20 | 11 54.52 | + 0 1 44.5 | 1 46.5 | 8.4305 | 9.2201 | 2.95 | 3.80 |
| 23 20 3.3 | 145 | 0 12 32.81 | 12 33.14 | 0 5 42.2 | 5 44.3 | 8.4262 | 9.2153 | 2.96 | 3.81 |
| 24 20 0.0 | 146 | 0 13 11.03 | 13 11.38 | 0 9 37.3 | 9 39.5 | 8.4218 | 9.2104 | 2.97 | 3.82 |
| 25 19 56.7 | 147 | 0 13 48.86 | 13 49.23 | 0 13 29.7 | 13 31.9 | 8.4173 | 9.2053 | 2.98 | 3.83 |
| 26 19 53.4 | 148 | 0 14 26.30 | 14 26.68 | 0 17 19.3 | 17 21.6 | 8.4127 | 9.2001 | 2.98 | 3.84 |
| 27 19 50.1 | 149 | 0 15 3.34 | 15 3.73 | 0 21 6.1 | 21 8.5 | 8.4080 | 9.1947 | 2.99 | 3.84 |
| 28 19 46.8 | 150 | 0 15 39.97 | 15 40.37 | 0 24 50.0 | 24 52.5 | 8.4031 | 9.1891 | 3.00 | 3.85 |
| 29 19 43.5 | 151 | 0 16 16.18 | 16 16.60 | 0 28 31.1 | 28 33.6 | 8.3981 | 9.1833 | 3.01 | 3.86 |
| 30 19 40.2 | 152 | 0 16 51.97 | 16 52.40 | 0 32 9.2 | 32 11.8 | 8.3930 | 9.1774 | 3.01 | 3.86 |
| 31 19 36.8 | 153 | 0 17 27.33 | 17 27.77 | 0 35 44.3 | 35 47.0 | 8.3877 | 9.1713 | 3.02 | 3.87 |
| June 1 19 33.4 | 154 | 0 18 2.26 | 18 2.70 | 0 39 16.4 | 39 19.1 | 8.3822 | 9.1651 | 3.03 | 3.87 |
| 2 19 30.1 | 155 | 0 18 36.74 | 18 37.19 | 0 42 45.4 | 42 48.2 | 8.3766 | 9.1586 | 3.03 | 3.88 |
| 3 19 26.7 | 156 | 0 19 10.77 | 19 11.23 | 0 46 11.3 | 46 14.1 | 8.3708 | 9.1520 | 3.04 | 3.88 |
| 4 19 23.3 | 157 | 0 19 44.35 | 19 44.82 | 0 49 34.1 | 49 36.9 | 8.3648 | 9.1452 | 3.04 | 3.89 |
| 5 19 19.9 | 158 | 0 20 17.47 | 20 17.95 | 0 52 53.7 | 52 56.5 | 8.3587 | 9.1383 | 3.05 | 3.89 |
| 6 19 16.5 | 159 | 0 20 50.13 | 20 50.61 | 0 56 10.1 | 56 12.9 | 8.3524 | 9.1312 | 3.06 | 3.90 |
| 7 19 13.1 | 160 | 0 21 22.32 | 21 22.80 | 0 59 23.2 | 59 26.1 | 8.3460 | 9.1239 | 3.06 | 3.90 |
| 8 19 9.7 | 161 | 0 21 54.03 | 21 54.51 | 1 2 33.0 | 2 36.0 | 8.3394 | 9.1164 | 3.07 | 3.91 |
| 9 19 6.3 | 162 | 0 22 25.25 | 22 25.74 | 1 5 39.6 | 5 42.6 | 8.3327 | 9.1086 | 3.07 | 3.91 |
| 10 19 2.9 | 163 | 0 22 55.99 | 22 56.48 | 1 8 42.9 | 8 45.8 | 8.3257 | 9.1006 | 3.07 | 3.91 |
| 11 18 59.5 | 164 | 0 23 26.23 | 23 26.73 | 1 11 42.7 | 11 45.6 | 8.3186 | 9.0923 | 3.08 | 3.92 |
| 12 18 56.1 | 165 | 0 23 55.97 | 23 56.47 | 1 14 39.1 | 14 42.0 | 8.3113 | 9.0838 | 3.08 | 3.92 |
| 13 18 52.6 | 166 | 0 24 25.21 | 24 25.71 | 1 17 32.0 | 17 34.9 | 8.3038 | 9.0751 | 3.09 | 3.92 |
| 14 18 49.2 | 167 | 0 24 53.94 | 24 54.43 | 1 20 21.5 | 20 24.3 | 8.2961 | 9.0661 | 3.09 | 3.93 |
| 15 18 45.7 | 168 | 0 25 22.15 | 25 22.64 | 1 23 7.4 | 23 10.2 | 8.2881 | 9.0569 | 3.10 | 3.93 |
| 16 18 42.2 | 169 | 0 25 49.84 | 25 50.33 | 1 25 49.8 | 25 52.6 | 8.2799 | 9.0474 | 3.10 | 3.94 |
| 17 18 38.7 | 170 | 0 26 17.01 | 26 17.50 | 1 28 28.6 | 28 31.4 | 8.2715 | 9.0376 | 3.11 | 3.94 |
| 18 18 35.2 | 171 | 0 26 43.64 | 26 44.13 | 1 31 3.8 | 31 6.6 | 8.2628 | 9.0275 | 3.11 | 3.95 |
| 19 18 31.7 | 172 | 0 27 9.73 | 27 10.22 | 1 33 35.3 | 33 38.1 | 8.2538 | 9.0170 | 3.12 | 3.95 |
| 20 18 28.2 | 173 | 0 27 35.28 | 27 35.77 | 1 36 3.2 | 36 5.9 | 8.2445 | 9.0062 | 3.12 | 3.96 |
| 21 18 24.7 | 174 | 0 28 0.28 | 28 0.76 | 1 38 27.4 | 38 30.1 | 8.2348 | 8.9949 | 3.13 | 3.96 |
| 22 18 21.2 | 175 | 0 28 24.72 | 28 25.19 | 1 40 47.9 | 40 50.5 | 8.2247 | 8.9832 | 3.13 | 3.97 |
| 23 18 17.7 | 176 | 0 28 48.59 | 28 49.06 | 1 43 4.5 | 43 7.1 | 8.2143 | 8.9710 | 3.14 | 3.97 |
| 24 18 14.1 | 177 | 0 29 11.89 | 29 12.36 | 1 45 17.2 | 45 19.8 | 8.2036 | 8.9584 | 3.14 | 3.98 |
| 25 18 10.5 | 178 | 0 29 34.61 | 29 35.07 | 1 47 26.1 | 47 28.7 | 8.1924 | 8.9453 | 3.15 | 3.98 |
| 26 18 7.0 | 179 | 0 29 56.74 | 29 57.20 | 1 49 31.1 | 49 33.6 | 8.1808 | 8.9316 | 3.15 | 3.99 |
| 27 18 3.4 | 180 | 0 30 18.28 | 30 18.73 | 1 51 32.1 | 51 34.6 | 8.1688 | 8.9173 | 3.16 | 3.99 |
| 28 17 59.8 | 181 | 0 30 39.22 | 30 39.66 | 1 53 29.1 | 53 31.6 | 8.1564 | 8.9024 | 3.16 | 4.00 |
| 29 17 56.2 | 182 | 0 30 59.55 | 30 59.98 | 1 55 22.0 | 55 24.5 | 8.1434 | 8.8868 | 3.17 | 4.00 |
| 30 17 52.6 | 183 | 0 31 19.27 | 31 19.79 | 1 57 10.9 | 57 13.3 | 8.1298 | 8.8704 | 3.17 | 4.00 |
| 31 17 49.0 | 184 | 0 31 38.38 | 31 38.78 | + 1 58 55.7 | 58 58.0 | +8.1157 | +8.8532 | −3.18 | −4.01 |

NOTE. — The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$ in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d h m. |  | h. m. s. | m. s | ° ′ ″ | ′ ″ |  |  |  |  |
| July 1 17 49.0 | 184 | 0 31 38.38 | 31 38.78 | + 1 58 55.7 | 58 58.0 | +8.1157 | +8.8532 | −3.18 | −4.01 |
| 2 17 45.4 | 185 | 0 31 56.86 | 31 57.25 | 2 0 36.3 | 0 38.5 | 8.1010 | 8.8353 | 3.18 | 4.01 |
| 3 17 41.7 | 186 | 0 32 14.70 | 32 15.09 | 2 2 12.7 | 2 14.8 | 8.0855 | 8.8164 | 3.19 | 4.01 |
| 4 17 38.1 | 187 | 0 32 31.91 | 32 32.29 | 2 3 44.9 | 3 46.9 | 8.0693 | 8.7964 | 3.19 | 4.01 |
| 5 17 34.5 | 188 | 0 32 48.48 | 32 48.85 | 2 5 12.9 | 5 14.8 | 8.0523 | 8.7754 | 3.19 | 4.01 |
| 6 17 30.8 | 189 | 0 33 4.40 | 33 4.76 | 2 6 36.6 | 6 38.4 | 8.0347 | 8.7532 | 3.20 | 4.01 |
| 7 17 27.1 | 190 | 0 33 19.67 | 33 20.02 | 2 7 56.1 | 7 57.8 | 8.0161 | 8.7299 | 3.20 | 4.01 |
| 8 17 23.4 | 191 | 0 33 34.28 | 33 34.63 | 2 9 11.3 | 9 12.8 | 7.9965 | 8.7052 | 3.20 | 4.01 |
| 9 17 19.7 | 192 | 0 33 48.24 | 33 48.57 | 2 10 22.1 | 10 23.6 | 7.9760 | 8.6785 | 3.20 | 4.01 |
| 10 17 16.0 | 193 | 0 34 1.53 | 34 1.85 | 2 11 28.6 | 11 30.0 | 7.9542 | 8.6498 | 3.21 | 4.02 |
| 11 17 12.3 | 194 | 0 34 14.16 | 34 14.46 | 2 12 30.7 | 12 32.1 | 7.9313 | 8.6195 | 3.21 | 4.02 |
| 12 17 8.6 | 195 | 0 34 26.12 | 34 26.40 | 2 13 28.5 | 13 29.8 | 7.9068 | 8.5866 | 3.21 | 4.02 |
| 13 17 4.9 | 196 | 0 34 37.40 | 34 37.66 | 2 14 21.9 | 14 23.1 | 7.8808 | 8.5509 | 3.21 | 4.02 |
| 14 17 1.1 | 197 | 0 34 48.00 | 34 48.24 | 2 15 10.8 | 15 12.0 | 7.8528 | 8.5116 | 3.22 | 4.03 |
| 15 16 57.3 | 198 | 0 34 57.92 | 34 58.14 | 2 15 55.3 | 15 56.4 | 7.8228 | 8.4686 | 3.22 | 4.03 |
| 16 16 53.5 | 199 | 0 35 7.15 | 35 7.36 | 2 16 35.4 | 16 36.4 | 7.7903 | 8.4203 | 3.22 | 4.03 |
| 17 16 49.7 | 200 | 0 35 15.69 | 35 15.89 | 2 17 11.1 | 17 11.9 | 7.7549 | 8.3658 | 3.22 | 4.04 |
| 18 16 45.9 | 201 | 0 35 23.54 | 35 23.72 | 2 17 42.3 | 17 42.9 | 7.7163 | 8.3029 | 3.23 | 4.04 |
| 19 16 42.1 | 202 | 0 35 30.69 | 35 30.85 | 2 18 9.0 | 18 9.5 | 7.6737 | 8.2290 | 3.23 | 4.04 |
| 20 16 38.3 | 203 | 0 35 37.13 | 35 37.28 | 2 18 31.1 | 18 31.5 | 7.6263 | 8.1389 | 3.23 | 4.04 |
| 21 16 34.5 | 204 | 0 35 42.87 | 35 43.00 | 2 18 48.7 | 18 49.0 | 7.5726 | 8.0249 | 3.24 | 4.05 |
| 22 16 30.6 | 205 | 0 35 47.90 | 35 48.01 | 2 19 1.7 | 19 1.9 | 7.5121 | 7.8700 | 3.24 | 4.05 |
| 23 16 26.7 | 206 | 0 35 52.21 | 35 52.31 | 2 19 10.2 | 19 10.3 | 7.4394 | 7.6270 | 3.24 | 4.05 |
| 24 16 22.8 | 207 | 0 35 55.81 | 35 55.89 | 2 19 14.1 | 19 14.0 | 7.3516 | +7.0249 | 3.24 | 4.05 |
| 25 16 18.9 | 208 | 0 35 58.68 | 35 58.75 | 2 19 13.3 | 19 13.2 | 7.2413 | −7.3260 | 3.24 | 4.05 |
| 26 16 15.0 | 209 | 0 36 0.83 | 36 0.88 | 2 19 7.9 | 19 7.8 | 7.0927 | 7.7239 | 3.25 | 4.05 |
| 27 16 11.1 | 210 | 0 36 2.25 | 36 2.29 | 2 18 58.0 | 18 57.7 | 6.8639 | 7.9289 | 3.25 | 4.05 |
| 28 16 7.2 | 211 | 0 36 2.94 | 36 2.97 | 2 18 43.4 | 18 43.0 | +6.3569 | 8.0689 | 3.25 | 4.05 |
| 29 16 3.3 | 212 | 0 36 2.91 | 36 2.91 | 2 18 24.2 | 18 23.7 | −6.4410 | 8.1746 | 3.25 | 4.05 |
| 30 15 59.3 | 213 | 0 36 2.14 | 36 2.12 | 2 18 0.4 | 17 59.7 | 6.8918 | 8.2595 | 3.25 | 4.05 |
| 31 15 55.3 | 214 | 0 36 0.65 | 36 0.61 | 2 17 31.9 | 17 31.1 | 7.1082 | 8.3302 | 3.25 | 4.05 |
| Aug. 1 15 51.4 | 215 | 0 35 58.43 | 35 58.37 | 2 16 58.8 | 16 57.9 | 7.2536 | 8.3906 | 3.25 | 4.05 |
| 2 15 47.4 | 216 | 0 35 55.48 | 35 55.40 | 2 16 21.1 | 16 20.1 | 7.3633 | 8.4435 | 3.25 | 4.04 |
| 3 15 43.4 | 217 | 0 35 51.80 | 35 51.70 | 2 15 38.8 | 15 37.7 | 7.4485 | 8.4905 | 3.24 | 4.04 |
| 4 15 39.4 | 218 | 0 35 47.40 | 35 47.28 | 2 14 51.9 | 14 50.7 | 7.5202 | 8.5328 | 3.24 | 4.04 |
| 5 15 35.4 | 219 | 0 35 42.27 | 35 42.14 | 2 14 0.5 | 13 59.2 | 7.5816 | 8.5714 | 3.24 | 4.04 |
| 6 15 31.4 | 220 | 0 35 36.42 | 35 36.27 | 2 13 4.6 | 13 3.1 | 7.6350 | 8.6068 | 3.24 | 4.03 |
| 7 15 27.4 | 221 | 0 35 29.85 | 35 29.68 | 2 12 4.2 | 12 2.6 | 7.6824 | 8.6391 | 3.23 | 4.03 |
| 8 15 23.3 | 222 | 0 35 22.57 | 35 22.38 | 2 10 59.3 | 10 57.6 | 7.7248 | 8.6687 | 3.23 | 4.03 |
| 9 15 19.3 | 223 | 0 35 14.58 | 35 14.37 | 2 9 50.0 | 9 48.2 | 7.7632 | 8.6960 | 3.23 | 4.03 |
| 10 15 15.2 | 224 | 0 35 5.88 | 35 5.65 | 2 8 36.3 | 8 34.4 | 7.7983 | 8.7216 | 3.23 | 4.02 |
| 11 15 11.1 | 225 | 0 34 56.48 | 34 56.23 | 2 7 18.3 | 7 16.3 | 7.8306 | 8.7455 | 3.22 | 4.02 |
| 12 15 7.0 | 226 | 0 34 46.39 | 34 46.12 | 2 5 56.0 | 5 53.9 | 7.8606 | 8.7682 | 3.22 | 4.02 |
| 13 15 2.9 | 227 | 0 34 35.60 | 34 35.32 | 2 4 29.4 | 4 27.3 | 7.8885 | 8.7897 | 3.22 | 4.01 |
| 14 14 58.8 | 228 | 0 34 24.13 | 34 23.84 | 2 2 58.6 | 2 56.4 | 7.9145 | 8.8099 | 3.22 | 4.01 |
| 15 14 54.7 | 229 | 0 34 11.97 | 34 11.67 | 2 1 23.6 | 1 21.3 | 7.9388 | 8.8290 | 3.21 | 4.01 |
| 16 14 50.5 | 230 | 0 33 59.13 | 33 58.82 | 1 59 44.5 | 59 42.1 | 7.9616 | 8.8471 | 3.21 | 4.00 |
| 17 14 46.4 | 231 | 0 33 45.62 | 33 45.30 | 1 58 1.2 | 57 58.8 | 7.9831 | 8.8641 | 3.21 | 4.00 |
| 18 14 42.2 | 232 | 0 33 31.44 | 33 31.11 | 1 56 13.9 | 56 11.4 | 8.0033 | 8.8804 | 3.21 | 3.99 |
| 19 14 38.0 | 233 | 0 33 16.61 | 33 16.26 | 1 54 22.6 | 54 20.0 | 8.0224 | 8.8958 | 3.20 | 3.99 |
| 20 14 33.8 | 234 | 0 33 1.13 | 33 0.77 | 1 52 27.3 | 52 24.7 | 8.0405 | 8.9105 | 3.20 | 3.98 |
| 21 14 29.6 | 235 | 0 32 45.01 | 32 44.63 | 1 50 28.1 | 50 25.5 | 8 0577 | 8.9247 | 3.19 | 3.98 |
| 22 14 25.4 | 236 | 0 32 28.25 | 32 27.86 | 1 48 25.1 | 48 22.4 | 8.0741 | 8.9383 | 3.19 | 3.97 |
| 23 14 21.2 | 237 | 0 32 10.86 | 32 10.46 | 1 46 18.3 | 46 15.5 | 8.0897 | 8.9514 | 3.18 | 3.96 |
| 24 14 16.9 | 238 | 0 31 52.85 | 31 52.44 | 1 44 7.7 | 44 4.9 | 8.1045 | 8.9637 | 3.17 | 3.95 |
| 25 14 12.7 | 239 | 0 31 34.23 | 31 33.82 | 1 41 53.5 | 41 50.6 | 8.1183 | 8.9754 | 3.17 | 3.94 |
| 26 14 8.5 | 240 | 0 31 15.02 | 31 14.60 | 1 39 35.7 | 39 32.7 | 8.1316 | 8.9864 | 3.16 | 3.93 |
| 27 14 4.2 | 241 | 0 30 55.23 | 30 54.79 | 1 37 14.4 | 37 11.4 | 8.1443 | 8.9967 | 3.15 | 3.92 |
| 28 13 59.9 | 242 | 0 30 34.86 | 30 34.42 | 1 34 49.8 | 34 46.7 | 8.1564 | 9.0067 | 3.14 | 3.91 |
| 29 13 55.6 | 243 | 0 30 13.94 | 30 13.50 | 1 32 21.9 | 32 18.7 | 8.1679 | 9.0163 | 3.13 | 3.90 |
| 30 13 51.3 | 244 | 0 29 52.47 | 29 52.02 | 1 29 50.8 | 29 47.5 | 8.1789 | 9.0255 | 3.12 | 3.88 |
| 31 13 47.0 | 245 | 0 29 30.47 | 29 30.01 | + 1 27 16.5 | 27 13.2 | −8.1893 | −9.0342 | −3.10 | −3.86 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$ in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Sept. 1 13 42.7 | 246 | 0 29 7.95 | 29 7.49 | + 1 24 39.2 | 24 35.9 | −8.1990 | −9.0424 | −3.08 | −3.84 |
| 2 13 38.4 | 247 | 0 28 44.93 | 28 44.48 | 1 21 59.0 | 21 55.7 | 8.2083 | 9.0500 | 3.07 | 3.82 |
| 3 13 34.1 | 248 | 0 28 21.43 | 28 20.98 | 1 19 16.1 | 19 12.8 | 8.2170 | 9.0573 | 3.06 | 3.80 |
| 4 13 29.8 | 249 | 0 27 57.46 | 27 57.02 | 1 16 30.5 | 16 27.3 | 8.2253 | 9.0644 | 3.04 | 3.78 |
| 5 13 25.4 | 250 | 0 27 33.05 | 27 32.60 | 1 13 42.4 | 13 39.2 | 8.2331 | 9.0705 | 3.02 | 3.76 |
| 6 13 21.1 | 251 | 0 27 8.21 | 27 7.75 | 1 10 51.9 | 10 48.7 | 8.2404 | 9.0764 | 3.00 | 3.74 |
| 7 13 16.7 | 252 | 0 26 42.95 | 26 42.48 | 1 7 59.1 | 7 55.9 | 8.2474 | 9.0820 | 2.98 | 3.72 |
| 8 13 12.3 | 253 | 0 26 17.29 | 26 16.82 | 1 5 4.1 | 5 1.0 | 8.2540 | 9.0872 | 2.96 | 3.70 |
| 9 13 7.9 | 254 | 0 25 51.25 | 25 50.79 | 1 2 7.1 | 2 4.0 | 8.2602 | 9.0921 | 2.94 | 3.67 |
| 10 13 3.6 | 255 | 0 25 24.86 | 25 24.40 | 0 59 8.2 | 59 5.1 | 8.2659 | 9.0966 | 2.92 | 3.64 |
| 11 12 59.2 | 256 | 0 24 58.13 | 24 57.67 | 0 56 7.5 | 56 4.4 | 8.2713 | 9.1007 | 2.90 | 3.61 |
| 12 12 54.8 | 257 | 0 24 31.08 | 24 30.62 | 0 53 5.1 | 53 2.0 | 8.2763 | 9.1045 | 2.87 | 3.58 |
| 13 12 50.4 | 258 | 0 24 3.72 | 24 3.26 | 0 50 1.1 | 49 58.0 | 8.2810 | 9.1080 | 2.84 | 3.55 |
| 14 12 46.0 | 259 | 0 23 36.08 | 23 35.62 | 0 46 55.7 | 46 52.6 | 8.2853 | 9.1113 | 2.81 | 3.51 |
| 15 12 41.6 | 260 | 0 23 8.17 | 23 7.72 | 0 43 49.0 | 43 45.9 | 8.2893 | 9.1142 | 2.78 | 3.46 |
| 16 12 37.2 | 261 | 0 22 40.01 | 22 39.57 | 0 40 41.2 | 40 38.1 | 8.2930 | 9.1168 | 2.75 | 3.40 |
| 17 12 32.8 | 262 | 0 22 11.63 | 22 11.19 | 0 37 32.3 | 37 29.3 | 8.2968 | 9.1190 | 2.71 | 3.34 |
| 18 12 28.4 | 263 | 0 21 43.05 | 21 42.61 | 0 34 22.5 | 34 19.6 | 8.2993 | 9.1209 | 2.66 | 3.25 |
| 19 12 24.0 | 264 | 0 21 14.28 | 21 13.84 | 0 31 11.9 | 31 9.1 | 8.3019 | 9.1225 | 2.61 | 3.13 |
| 20 12 19.6 | 265 | 0 20 45.34 | 20 44.91 | 0 28 0.7 | 27 57.9 | 8.3042 | 9.1237 | 2.55 | 2.99 |
| 21 12 15.2 | 266 | 0 20 16.25 | 20 15.83 | 0 24 49.0 | 24 46.3 | 8.3062 | 9.1246 | 2.49 | −2.83 |
| 22 12 10.8 | 267 | 0 19 47.04 | 19 46.63 | 0 21 37.0 | 21 34.3 | 8.3080 | 9.1252 | 2.39 |  |
| 23 12 6.4 | 268 | 0 19 17.73 | 19 17.33 | 0 18 24.8 | 18 22.2 | 8.3095 | 9.1255 | 2.25 |  |
| 24 12 2.0 | 269 | 0 18 48.34 | 18 47.96 | 0 15 12.6 | 15 10.0 | 8.3106 | 9.1254 | 2.07 |  |
| 25 11 57.6 | 270 | 0 18 18.90 | 18 18.53 | 0 12 0.4 | 11 57.9 | 8.3113 | 9.1250 | −1.86 | +2.78 |
| 26 11 53.2 | 271 | 0 17 49.43 | 17 49.06 | 0 8 48.5 | 8 46.1 | 8.3116 | 9.1242 |  | 2.96 |
| 27 11 48.8 | 272 | 0 17 19.94 | 17 19.58 | 0 5 37.0 | 5 34.7 | 8.3115 | 9.1231 |  | 3.12 |
| 28 11 44.4 | 273 | 0 16 50.47 | 16 50.12 | + 0 2 26.1 | 2 23.8 | 8.3110 | 9.1217 |  | 3.25 |
| 29 11 39.9 | 274 | 0 16 21.04 | 16 20.70 | − 0 0 44.1 | 0 46.3 | 8.3102 | 9.1199 | +2.22 | 3.35 |
| 30 11 35.5 | 275 | 0 15 51.67 | 15 51.34 | 0 3 53.5 | 3 55.6 | 8.3090 | 9.1178 | 2.34 | 3.42 |
| Oct. 1 11 31.1 | 276 | 0 15 22.39 | 15 22.07 | 0 7 1.8 | 7 3.8 | 8.3075 | 9.1154 | 2.44 | 3.48 |
| 2 11 26.7 | 277 | 0 14 53.22 | 14 52.91 | 0 10 8.9 | 10 10.9 | 8.3057 | 9.1125 | 2.52 | 3.53 |
| 3 11 22.2 | 278 | 0 14 24.18 | 14 23.88 | 0 13 14.7 | 13 16.6 | 8.3035 | 9.1092 | 2.59 | 3.57 |
| 4 11 17.8 | 279 | 0 13 55.30 | 13 55.01 | 0 16 19.0 | 16 20.8 | 8.3010 | 9.1054 | 2.65 | 3.60 |
| 5 11 13.4 | 280 | 0 13 26.60 | 13 26.32 | 0 19 21.7 | 19 23.4 | 8.2981 | 9.1012 | 2.70 | 3.63 |
| 6 11 9.0 | 281 | 0 12 58.09 | 12 57.83 | 0 22 22.6 | 22 24.2 | 8.2949 | 9.0968 | 2.74 | 3.66 |
| 7 11 4.6 | 282 | 0 12 29.80 | 12 29.56 | 0 25 21.5 | 25 23.1 | 8.2914 | 9.0919 | 2.78 | 3.69 |
| 8 11 0.2 | 283 | 0 12 1.75 | 12 1.53 | 0 28 18.4 | 28 20.0 | 8.2876 | 9.0868 | 2.81 | 3.72 |
| 9 10 55.8 | 284 | 0 11 33.97 | 11 33.76 | 0 31 13.1 | 31 14.6 | 8.2834 | 9.0813 | 2.84 | 3.75 |
| 10 10 51.4 | 285 | 0 11 6.47 | 11 6.27 | 0 34 5.5 | 34 6.9 | 8.2789 | 9.0755 | 2.87 | 3.77 |
| 11 10 47.0 | 286 | 0 10 39.27 | 10 39.08 | 0 36 55.6 | 36 56.8 | 8.2737 | 9.0692 | 2.89 | 3.79 |
| 12 10 42.6 | 287 | 0 10 12.40 | 10 12.22 | 0 39 43.1 | 39 44.3 | 8.2682 | 9.0626 | 2.92 | 3.81 |
| 13 10 38.2 | 288 | 0 9 45.87 | 9 45.70 | 0 42 28.0 | 42 29.1 | 8.2624 | 9.0555 | 2.94 | 3.83 |
| 14 10 33.8 | 289 | 0 9 19.70 | 9 19.54 | 0 45 10.1 | 45 11.1 | 8.2562 | 9.0479 | 2.96 | 3.85 |
| 15 10 29.5 | 290 | 0 8 53.91 | 8 53.76 | 0 47 49.3 | 47 50.2 | 8.2496 | 9.0399 | 2.98 | 3.86 |
| 16 10 25.1 | 291 | 0 8 28.51 | 8 28.38 | 0 50 25.5 | 50 26.4 | 8.2426 | 9.0314 | 3.00 | 3.38 |
| 17 10 20.7 | 292 | 0 8 3.53 | 8 3.41 | 0 52 58.6 | 52 59.5 | 8.2352 | 9.0224 | 3.02 | 3.90 |
| 18 10 16.4 | 293 | 0 7 38.98 | 7 38.86 | 0 55 28.5 | 55 29.4 | 8.2274 | 9.0129 | 3.04 | 3.91 |
| 19 10 12.1 | 294 | 0 7 14.87 | 7 14.75 | 0 57 55.1 | 57 55.9 | 8.2192 | 9.0028 | 3.06 | 3.92 |
| 20 10 7.8 | 295 | 0 6 51.22 | 6 51.11 | 1 0 18.3 | 0 19.0 | 8.2106 | 8.9920 | 3.08 | 3.94 |
| 21 10 3.5 | 296 | 0 6 28.06 | 6 27.96 | 1 2 38.0 | 2 38.6 | 8.2014 | 8.9808 | 3.09 | 3.95 |
| 22 9 59.2 | 297 | 0 6 5.40 | 6 5.31 | 1 4 54.1 | 4 54.6 | 8.1917 | 8.9691 | 3.10 | 3.96 |
| 23 9 54.9 | 298 | 0 5 43.26 | 5 43.17 | 1 7 6.4 | 7 6.9 | 8.1815 | 8.9568 | 3.11 | 3.97 |
| 24 9 50.6 | 299 | 0 5 21.65 | 5 21.57 | 1 9 14.9 | 9 15.4 | 8.1707 | 8.9438 | 3.13 | 3.98 |
| 25 9 46.3 | 300 | 0 5 0.59 | 5 0.52 | 1 11 19.4 | 11 19.9 | 8.1593 | 8.9300 | 3.14 | 3.99 |
| 26 9 42.0 | 301 | 0 4 40.09 | 4 40.03 | 1 13 19.9 | 13 20.4 | 8.1474 | 8.9156 | 3.15 | 4.00 |
| 27 9 37.8 | 302 | 0 4 20.17 | 4 20.11 | 1 15 16.4 | 15 16.8 | 8.1346 | 8.9002 | 3.16 | 4.01 |
| 28 9 33.5 | 303 | 0 4 0.84 | 4 0.79 | 1 17 8.7 | 17 9.0 | 8.1211 | 8.8834 | 3.17 | 4.02 |
| 29 9 29.2 | 304 | 0 3 42.12 | 3 42.07 | 1 18 56.7 | 18 57.0 | 8.1068 | 8.8659 | 3.18 | 4.03 |
| 30 9 25.0 | 305 | 0 3 24.02 | 3 23.97 | 1 20 40.4 | 20 40.7 | 8.0919 | 8.8481 | 3.19 | 4.04 |
| 31 9 20.8 | 306 | 0 3 6.55 | 3 6.51 | 1 22 19.7 | 22 19.9 | 8.0760 | 8.8287 | 3.20 | 4.04 |
| 32 9 16.6 | 307 | 0 2 49.73 | 2 49.69 | − 1 23 54.5 | 23 54.7 | −8.0591 | −8.8074 | +3.20 | +4.05 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$ in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Nov. 1 9 16.6 | 307 | 0 2 49.73 | 2 49.69 | − 1 23 54.5 | 23 54.7 | −8.0591 | −8.8074 | +3.20 | +4.05 |
| 2 9 12.4 | 308 | 0 2 33.56 | 2 33.53 | 1 25 24.7 | 25 24.9 | 8.0413 | 8.7851 | 3.21 | 4.05 |
| 3 9 8.2 | 309 | 0 2 18.06 | 2 18.03 | 1 26 50.3 | 26 50.5 | 8.0226 | 8.7617 | 3.21 | 4.06 |
| 4 9 4.0 | 310 | 0 2 3.23 | 2 3.20 | 1 28 11.3 | 28 11.4 | 8.0027 | 8.7371 | 3.22 | 4.06 |
| 5 8 59.8 | 311 | 0 1 49.08 | 1 49.06 | 1 29 27.6 | 29 27.6 | 7.9815 | 8.7103 | 3.22 | 4.06 |
| 6 8 55.6 | 312 | 0 1 35.63 | 1 35.61 | 1 30 39.1 | 30 39.1 | 7.9590 | 8.6816 | 3.22 | 4.06 |
| 7 8 51.5 | 313 | 0 1 22.87 | 1 22.85 | 1 31 45.9 | 31 45.9 | 7.9352 | 8.6505 | 3.23 | 4.06 |
| 8 8 47.4 | 314 | 0 1 10.82 | 1 10.80 | 1 32 47.9 | 32 47.9 | 7.9097 | 8.6171 | 3.23 | 4.07 |
| 9 8 43.3 | 315 | 0 0 59.48 | 0 59.46 | 1 33 45.1 | 33 45.1 | 7.8826 | 8.5802 | 3.24 | 4.07 |
| 10 8 39.2 | 316 | 0 0 48.85 | 0 48.84 | 1 34 37.5 | 34 37.4 | 7.8533 | 8.5401 | 3.24 | 4.07 |
| 11 8 35.1 | 317 | 0 0 38.94 | 0 38.94 | 1 35 25.0 | 35 24.9 | 7.8218 | 8.4954 | 3.24 | 4.07 |
| 12 8 31.0 | 318 | 0 0 29.75 | 0 29.75 | 1 36 7.6 | 36 7.5 | 7.7874 | 8.4450 | 3.25 | 4.07 |
| 13 8 26.9 | 319 | 0 0 21.29 | 0 21.29 | 1 36 45.2 | 36 45.2 | 7.7496 | 8.3878 | 3.25 | 4.07 |
| 14 8 22.8 | 320 | 0 0 13.57 | 0 13.57 | 1 37 17.9 | 37 17.9 | 7.7079 | 8.3216 | 3.25 | 4.08 |
| 15 8 18.8 | 321 | 0 0 6.59 | 0 6.59 | 1 37 45.7 | 37 45.7 | 7.6617 | 8.2439 | 3.25 | 4.08 |
| 16 8 14.8 | 322 | 0 0 0.35 | 0 0.35 | 1 38 8.5 | 38 8.5 | 7.6097 | 8.1492 | 3.26 | 4.08 |
| 17 8 10.8 | 323 | 23 59 54.86 | 59 54.86 | 1 38 26.3 | 38 26.3 | 7.5505 | 8.0278 | 3.26 | 4.08 |
| 18 8 6.8 | 324 | 23 59 50.12 | 59 50.12 | 1 38 39.2 | 38 39.2 | 7.4818 | 7.8576 | 3.26 | 4.08 |
| 19 8 2.8 | 325 | 23 59 46.13 | 59 46.13 | 1 38 47.1 | 38 47.1 | 7.4001 | 7.5741 | 3.26 | 4.09 |
| 20 7 58.8 | 326 | 23 59 42.89 | 59 42.89 | 1 38 50.0 | 38 50.0 | 7.2988 | −6.4437 | 3.26 | 4.09 |
| 21 7 54.8 | 327 | 23 59 40.40 | 59 40.40 | 1 38 47.9 | 38 47.9 | 7.1649 | +7.5044 | 3.26 | 4.09 |
| 22 7 50.8 | 328 | 23 59 38.67 | 59 38.67 | 1 38 40.8 | 38 40.8 | 6.9704 | 7.8239 | 3.27 | 4.09 |
| 23 7 46.9 | 329 | 23 59 37.70 | 59 37.70 | 1 38 28.7 | 38 28.7 | −6.6088 | 8.0060 | 3.27 | 4.09 |
| 24 7 43.0 | 330 | 23 59 37.49 | 59 37.49 | 1 38 11.6 | 38 11.5 | +6.0847 | 8.1345 | 3.27 | 4.09 |
| 25 7 39.1 | 331 | 23 59 38.04 | 59 38.04 | 1 37 49.4 | 37 49.3 | 6.8125 | 8.2335 | 3.27 | 4.09 |
| 26 7 35.2 | 332 | 23 59 39.36 | 59 39.36 | 1 37 22.2 | 37 22.1 | 7.0708 | 8.3141 | 3.27 | 4.09 |
| 27 7 31.3 | 333 | 23 59 41.44 | 59 41.44 | 1 36 50.0 | 36 49.9 | 7.2317 | 8.3818 | 3.27 | 4.08 |
| 28 7 27.4 | 334 | 23 59 44.28 | 59 44.28 | 1 36 12.8 | 36 12.8 | 7.3489 | 8.4403 | 3.27 | 4.08 |
| 29 7 23.5 | 335 | 23 59 47.88 | 59 47.88 | 1 35 30.6 | 35 30.7 | 7.4410 | 8.4915 | 3.27 | 4.08 |
| 30 7 19.6 | 336 | 23 59 52.24 | 59 52.24 | 1 34 43.5 | 34 43.6 | 7.5170 | 8.5372 | 3.27 | 4.08 |
| Dec. 1 7 15.8 | 337 | 23 59 57.35 | 59 57.36 | 1 33 51.5 | 33 51.5 | 7.5814 | 8.5781 | 3.26 | 4.07 |
| 2 7 12.0 | 338 | 0 0 3.22 | 0 3.23 | 1 32 54.5 | 32 54.6 | 7.6372 | 8.6154 | 3.26 | 4.07 |
| 3 7 8.1 | 339 | 0 0 9.84 | 0 9.85 | 1 31 52.6 | 31 52.8 | 7.6863 | 8.6496 | 3.26 | 4.07 |
| 4 7 4.3 | 340 | 0 0 17.20 | 0 17.21 | 1 30 45.9 | 30 46.1 | 7.7302 | 8.6812 | 3.25 | 4.07 |
| 5 7 0.5 | 341 | 0 0 25.31 | 0 25.31 | 1 29 34.4 | 29 34.6 | 7.7698 | 8.7104 | 3.25 | 4.06 |
| 6 6 56.7 | 342 | 0 0 34.16 | 0 34.15 | 1 28 18.2 | 28 18.3 | 7.8059 | 8.7375 | 3.25 | 4.06 |
| 7 6 52.9 | 343 | 0 0 43.74 | 0 43.73 | 1 26 57.2 | 26 57.2 | 7.8393 | 8.7626 | 3.24 | 4.06 |
| 8 6 49.1 | 344 | 0 0 54.04 | 0 54.04 | 1 25 31.5 | 25 31.5 | 7.8699 | 8.7862 | 3.24 | 4.05 |
| 9 6 45.4 | 345 | 0 1 5.07 | 1 5.07 | 1 24 1.1 | 24 1.1 | 7.8984 | 8.8085 | 3.24 | 4.05 |
| 10 6 41.7 | 346 | 0 1 16.82 | 1 16.82 | 1 22 26.1 | 22 26.1 | 7.9248 | 8.8296 | 3.23 | 4.04 |
| 11 6 38.0 | 347 | 0 1 29.28 | 1 29.28 | 1 20 46.5 | 20 46.5 | 7.9493 | 8.8495 | 3.23 | 4.04 |
| 12 6 34.3 | 348 | 0 1 42.45 | 1 42.45 | 1 19 2.4 | 19 2.3 | 7.9723 | 8.8685 | 3.23 | 4.04 |
| 13 6 30.6 | 349 | 0 1 56.32 | 1 56.32 | 1 17 13.8 | 17 13.6 | 7.9942 | 8.8865 | 3.23 | 4.03 |
| 14 6 26.9 | 350 | 0 2 10.89 | 2 10.89 | 1 15 20.7 | 15 20.5 | 8.0150 | 8.9036 | 3.22 | 4.03 |
| 15 6 23.2 | 351 | 0 2 26.15 | 2 26.15 | 1 13 23.1 | 13 23.0 | 8.0346 | 8.9199 | 3.22 | 4.03 |
| 16 6 19.5 | 352 | 0 2 42.09 | 2 42.10 | 1 11 21.2 | 11 21.0 | 8.0534 | 8.9355 | 3.22 | 4.02 |
| 17 6 15.9 | 353 | 0 2 58.72 | 2 58.74 | 1 9 14.9 | 9 14.7 | 8.0713 | 8.9504 | 3.21 | 4.02 |
| 18 6 12.3 | 354 | 0 3 16.03 | 3 16.06 | 1 7 4.8 | 7 4.0 | 8.0884 | 8.9647 | 3.21 | 4.02 |
| 19 6 8.6 | 355 | 0 3 34.02 | 3 34.05 | 1 4 49.4 | 4 49.0 | 8.1047 | 8.9784 | 3.21 | 4.01 |
| 20 6 5.0 | 356 | 0 3 52.67 | 3 52.71 | 1 2 30.3 | 2 29.8 | 8.1202 | 8.9916 | 3.20 | 4.01 |
| 21 6 1.4 | 357 | 0 4 11.98 | 4 12.08 | 1 0 6.9 | 0 6.4 | 8.1350 | 9.0043 | 3.20 | 4.00 |
| 22 5 57.8 | 358 | 0 4 31.95 | 4 32.01 | 0 57 39.3 | 57 38.8 | 8.1493 | 9.0166 | 3.20 | 4.00 |
| 23 5 54.2 | 359 | 0 4 52.57 | 4 52.64 | 0 55 7.6 | 55 7.0 | 8.1629 | 9.0284 | 3.19 | 3.99 |
| 24 5 50.6 | 360 | 0 5 13.84 | 5 13.92 | 0 52 31.8 | 52 31.2 | 8.1760 | 9.0398 | 3.19 | 3.99 |
| 25 5 47.0 | 361 | 0 5 35.75 | 5 35.84 | 0 49 52.0 | 49 51.3 | 8.1885 | 9.0508 | 3.19 | 3.98 |
| 26 5 43.5 | 362 | 0 5 58.29 | 5 58.39 | 0 47 8.1 | 47 7.4 | 8.2006 | 9.0614 | 3.18 | 3.98 |
| 27 5 39.9 | 363 | 0 6 21.46 | 6 21.57 | 0 44 20.2 | 44 19.5 | 8.2123 | 9.0716 | 3.18 | 3.97 |
| 28 5 36.4 | 364 | 0 6 45.26 | 6 45.38 | 0 41 28.5 | 41 27.7 | 8.2236 | 9.0815 | 3.18 | 3.97 |
| 29 5 32.9 | 365 | 0 7 9.68 | 7 9.81 | 0 38 32.9 | 38 32.0 | 8.2346 | 9.0910 | 3.17 | 3.96 |
| 30 5 29.4 | 366 | 0 7 34.70 | 7 34.85 | 0 35 33.5 | 35 32.5 | 8.2453 | 9.1001 | 3.17 | 3.96 |
| 31 5 25.9 | 367 | 0 8 0.33 | 8 0.49 | 0 32 30.3 | 32 29 2 | 8.2554 | 9.1090 | 3.17 | 3.96 |
| 32 5 22.4 | 368 | 0 8 26.55 | 8 26.72 | − 0 29 23.3 | 29 22.2 | +8.2649 | +9.1179 | +3.16 | +3.95 |

NOTE. — The Transits, from Nov. 17 to Dec. 1, occur upon the Sidereal Day preceding the one for which they are given.

# SATURN, 1856.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Jan. 1 10 56.2 | 1 | 5 40 14.43 | 40 9.66 | +22 11 16.1 | 11 15.8 | −8.1469 | − 6.987 | +2.61 | +2.38 |
| 2 10 51.9 | 2 | 5 39 54.33 | 39 49.61 | 22 11 14.7 | 11 14.4 | 8.1431 | 6.954 | 2.63 | 2.44 |
| 3 10 47.7 | 3 | 5 39 34.40 | 39 29.73 | 22 11 13.5 | 11 13.2 | 8.1391 | 6.920 | 2.66 | 2.50 |
| 4 10 43.4 | 4 | 5 39 14.65 | 39 10.03 | 22 11 12.3 | 11 12.1 | 8.1347 | 6.840 | 2.68 | 2.56 |
| 5 10 39.1 | 5 | 5 38 55.11 | 38 50.54 | 22 11 11.3 | 11 11.1 | 8.1290 | 6.795 | 2.70 | 2.62 |
| 6 10 34.9 | 6 | 5 38 35.79 | 38 31.28 | 22 11 10.4 | 11 10.2 | 8.1251 | 6.744 | 2.72 | 2.68 |
| 7 10 30.6 | 7 | 5 38 16.70 | 38 12.25 | 22 11 9.7 | 11 9.5 | 8.1199 | 6.685 | 2.74 | 2.74 |
| 8 10 26.4 | 8 | 5 37 57.84 | 37 53.46 | 22 11 9.0 | 11 8.9 | 8.1144 | 6.581 | 2.75 | 2.79 |
| 9 10 22.2 | 9 | 5 37 39.22 | 37 34.90 | 22 11 8.5 | 11 8.4 | 8.1083 | 6.443 | 2.77 | 2.83 |
| 10 10 17.9 | 10 | 5 37 20.87 | 37 16.60 | 22 11 8.0 | 11 8.0 | 8.1018 | 6.238 | 2.78 | 2.85 |
| 11 10 13.7 | 11 | 5 37 2.79 | 36 58.60 | 22 11 7.7 | 11 7.7 | 8.0952 | − 5.840 | 2.80 | 2.86 |
| 12 10 9.5 | 12 | 5 36 44.99 | 36 40.87 | 22 11 7.7 | 11 7.7 | 8.0884 | + 5.840 | 2.82 | 2.86 |
| 13 10 5.2 | 13 | 5 36 27.49 | 36 23.43 | 22 11 7.8 | 11 7.9 | 8.0811 | 6.238 | 2.84 | 2.86 |
| 14 10 1.0 | 14 | 5 36 10.29 | 36 6.30 | 22 11 8.0 | 11 8.1 | 8.0736 | 6.443 | 2.85 | 2.86 |
| 15 9 56.8 | 15 | 5 35 53.39 | 35 49.48 | 22 11 8.4 | 11 8.6 | 8.0657 | 6.581 | 2.87 | 2.86 |
| 16 9 52.6 | 16 | 5 35 36.78 | 35 32.96 | 22 11 8.9 | 11 9.1 | 8.0576 | 6.685 | 2.89 | 2.86 |
| 17 9 48.4 | 17 | 5 35 20.49 | 35 16.76 | 22 11 9.7 | 11 9.9 | 8.0488 | 6.795 | 2.90 | 2.86 |
| 18 9 44.2 | 18 | 5 35 4.54 | 35 0.90 | 22 11 10.7 | 11 11.0 | 8.0397 | 6.901 | 2.91 | 2.86 |
| 19 9 40.0 | 19 | 5 34 48.96 | 34 45.40 | 22 11 11.8 | 11 12.2 | 8.0299 | 6.987 | 2.92 | 2.86 |
| 20 9 35.8 | 20 | 5 34 33.75 | 34 30.27 | 22 11 13.2 | 11 13.6 | 8.0197 | 7.045 | 2.93 | 2.86 |
| 21 9 31.7 | 21 | 5 34 18.89 | 34 15.50 | 22 11 14.8 | 11 15.2 | 8.0089 | 7.101 | 2.94 | 2.86 |
| 22 9 27.5 | 22 | 5 34 4.38 | 34 1.07 | 22 11 16.7 | 11 17.2 | 7.9979 | 7.152 | 2.95 | 2.86 |
| 23 9 23.3 | 23 | 5 33 50.22 | 33 47.00 | 22 11 18.8 | 11 19.3 | 7.9862 | 7.202 | 2.96 | 2.86 |
| 24 9 19.2 | 24 | 5 33 36.46 | 33 33.33 | 22 11 21.1 | 11 21.7 | 7.9742 | 7.245 | 2.96 | 2.86 |
| 25 9 15.0 | 25 | 5 33 23.09 | 33 20.05 | 22 11 23.8 | 11 24.4 | 7.9616 | 7.288 | 2.97 | 2.86 |
| 26 9 10.9 | 26 | 5 33 10.11 | 33 7.16 | 22 11 26.7 | 11 27.4 | 7.9486 | 7.332 | 2.98 | 2.86 |
| 27 9 6.7 | 27 | 5 32 57.52 | 32 54.67 | 22 11 29.9 | 11 30.7 | 7.9348 | 7.372 | 2.99 | 2.86 |
| 28 9 2.6 | 28 | 5 32 45.32 | 32 42.57 | 22 11 33.4 | 11 34.2 | 7.9203 | 7.407 | 3.00 | 2.86 |
| 29 8 58.4 | 29 | 5 32 33.55 | 32 30.89 | 22 11 37.2 | 11 38.1 | 7.9049 | 7.437 | 3.00 | 2.86 |
| 30 8 54.3 | 30 | 5 32 22.20 | 32 19.63 | 22 11 41.3 | 11 42.2 | 7.8890 | 7.465 | 3.01 | 2.86 |
| 31 8 50.2 | 31 | 5 32 11.26 | 32 8.80 | 22 11 45.6 | 11 46.6 | 7.8729 | 7.494 | 3.02 | 2.86 |
| Feb. 1 8 46.1 | 32 | 5 32 0.75 | 31 58.39 | 22 11 50.2 | 11 51.3 | 7.8540 | 7.522 | 3.02 | 2.86 |
| 2 8 42.0 | 33 | 5 31 50.67 | 31 48.42 | 22 11 55.1 | 11 56.3 | 7.8352 | 7.551 | 3.03 | 2.86 |
| 3 8 37.9 | 34 | 5 31 41.04 | 31 38.89 | 22 12 0.4 | 12 1.6 | 7.8154 | 7.581 | 3.03 | 2.86 |
| 4 8 33.8 | 35 | 5 31 31.86 | 31 29.81 | 22 12 6.0 | 12 7.3 | 7.7942 | 7.611 | 3.04 | 2.86 |
| 5 8 29.7 | 36 | 5 31 23.12 | 31 21.16 | 22 12 12.0 | 12 13.4 | 7.7713 | 7.633 | 3.04 | 2.86 |
| 6 8 25.7 | 37 | 5 31 14.83 | 31 12.99 | 22 12 18.3 | 12 19.8 | 7.7478 | 7.655 | 3.04 | 2.86 |
| 7 8 21.6 | 38 | 5 31 6.99 | 31 5.26 | 22 12 24.9 | 12 26.5 | 7.7218 | 7.677 | 3.04 | 2.86 |
| 8 8 17.6 | 39 | 5 30 59.62 | 30 57.99 | 22 12 31.9 | 12 33.5 | 7.6947 | 7.698 | 3.05 | 2.86 |
| 9 8 13.5 | 40 | 5 30 52.72 | 30 51.20 | 22 12 39.2 | 12 40.9 | 7.6652 | 7.718 | 3.05 | 2.86 |
| 10 8 9.5 | 41 | 5 30 46.29 | 30 44.88 | 22 12 46.9 | 12 48.7 | 7.6335 | 7.738 | 3.05 | 2.86 |
| 11 8 5.5 | 42 | 5 30 40.33 | 30 39.03 | 22 12 54.9 | 12 56.8 | 7.5993 | 7.757 | 3.05 | 2.87 |
| 12 8 1.4 | 43 | 5 30 34.85 | 30 33.66 | 22 13 3.2 | 13 5.2 | 7.5614 | 7.775 | 3.06 | 2.88 |
| 13 7 57.4 | 44 | 5 30 29.85 | 30 28.76 | 22 13 11.8 | 13 13.8 | 7.5198 | 7.792 | 3.06 | 2.90 |
| 14 7 53.4 | 45 | 5 30 25.32 | 30 24.34 | 22 13 20.9 | 13 23.0 | 7.4739 | 7.809 | 3.07 | 2.91 |
| 15 7 49.4 | 46 | 5 30 21.26 | 30 20.39 | 22 13 30.4 | 13 32.6 | 7.4225 | 7.825 | 3.07 | 2.93 |
| 16 7 45.4 | 47 | 5 30 17.69 | 30 16.93 | 22 13 40.2 | 13 42.5 | 7.3641 | 7.840 | 3.07 | 2.94 |
| 17 7 41.4 | 48 | 5 30 14.61 | 30 13.96 | 22 13 50.3 | 13 52.7 | 7.2968 | 7.856 | 3.07 | 2.95 |
| 18 7 37.5 | 49 | 5 30 12.00 | 30 11.47 | 22 14 0.7 | 14 3.2 | 7.2170 | 7.871 | 3.07 | 2.96 |
| 19 7 33.5 | 50 | 5 30 9.87 | 30 9.45 | 22 14 11.6 | 14 14.1 | 7.1169 | 7.886 | 3.07 | 2.97 |
| 20 7 29.5 | 51 | 5 30 8.23 | 30 7.92 | 22 14 22.8 | 14 25.4 | 6.9865 | 7.898 | 3.07 | 2.98 |
| 21 7 25.6 | 52 | 5 30 7.08 | 30 6.88 | 22 14 34.4 | 14 37.1 | 6.8042 | 7.910 | 3.07 | 2.98 |
| 22 7 21.7 | 53 | 5 30 6.41 | 30 6.32 | 22 14 46.2 | 14 49.0 | −6.4839 | 7.922 | 3.07 | 2.98 |
| 23 7 17.8 | 54 | 5 30 6.22 | 30 6.24 | 22 14 58.5 | 15 1.3 | +5.5394 | 7.934 | 3.07 | 2.98 |
| 24 7 13.9 | 55 | 5 30 6.51 | 30 6.65 | 22 15 11.0 | 15 13.9 | 6.5728 | 7.946 | 3.07 | 2.98 |
| 25 7 10.0 | 56 | 5 30 7.29 | 30 7.54 | 22 15 23.9 | 15 26.9 | 6.8532 | 7.958 | 3.07 | 2.98 |
| 26 7 6.1 | 57 | 5 30 8.56 | 30 8.92 | 22 15 37.2 | 15 40.3 | 7.0222 | 7.969 | 3.07 | 2.98 |
| 27 7 2.2 | 58 | 5 30 10.31 | 30 10.78 | 22 15 50.7 | 15 53.9 | 7.1436 | 7.980 | 3.07 | 2.98 |
| 28 6 58.3 | 59 | 5 30 12.55 | 30 13.13 | 22 16 4.7 | 16 7.9 | 7.2383 | 7.991 | 3.08 | 2.98 |
| 29 6 54.4 | 60 | 5 30 15.27 | 30 15.96 | 22 16 8.9 | 16 22.2 | 7.3146 | 8.000 | 3.08 | 2.98 |
| 30 6 50.6 | 61 | 5 30 18.47 | 30 19.27 | 22 16 33.5 | 16 36.9 | 7.3795 | 8.011 | 3.08 | 2.98 |
| 31 6 46.7 | 62 | 5 30 22.16 | 30 23.07 | +22 16 48.4 | 16 51.9 | +7.4359 | + 8.020 | +3.08 | +2.98 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of *t* in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Mar. 1 6 50.6 | 61 | 5 30 18.47 | 30 19.27 | +22 16 33.5 | 16 36.9 | +7.3795 | + 8.011 | +3.08 | +2.98 |
| 2 6 46.7 | 62 | 5 30 22.16 | 30 23.07 | 22 16 48.4 | 16 51.9 | 7.4359 | 8.020 | 3.08 | 2.98 |
| 3 6 42.9 | 63 | 5 30 26.33 | 30 27.35 | 22 17 3.7 | 17 7.3 | 7.4858 | 8.029 | 3.08 | 2.98 |
| 4 6 39.0 | 64 | 5 30 30.98 | 30 32.11 | 22 17 19.2 | 17 22.8 | 7.5306 | 8.038 | 3.07 | 2.98 |
| 5 6 35.1 | 65 | 5 30 36.11 | 30 37.35 | 22 17 35.1 | 17 38.8 | 7.5712 | 8.047 | 3.07 | 2.98 |
| 6 6 31.2 | 66 | 5 30 41.71 | 30 43.06 | 22 17 51.2 | 17 55.0 | 7.6083 | 8.055 | 3.07 | 2.98 |
| 7 6 27.4 | 67 | 5 30 47.79 | 30 49.25 | 22 18 7.7 | 18 11.6 | 7.6425 | 8.062 | 3.06 | 2.97 |
| 8 6 23.6 | 68 | 5 30 54.36 | 30 55.93 | 22 18 24.4 | 18 28.3 | 7.6742 | 8.069 | 3.06 | 2.96 |
| 9 6 19.8 | 69 | 5 31 1.40 | 31 3.08 | 22 18 41.5 | 18 45.5 | 7.7037 | 8.076 | 3.05 | 2.95 |
| 10 6 16.0 | 70 | 5 31 8.91 | 31 10.71 | 22 18 58.8 | 19 2.8 | 7.7308 | 8.083 | 3.05 | 2.94 |
| 11 6 12.2 | 71 | 5 31 16.90 | 31 18.81 | 22 19 16.3 | 19 20.4 | 7.7563 | 8.089 | 3.04 | 2.93 |
| 12 6 8.4 | 72 | 5 31 25.36 | 31 27.37 | 22 19 34.2 | 19 38.3 | 7.7804 | 8.095 | 3.04 | 2.92 |
| 13 6 4.6 | 73 | 5 31 34.28 | 31 36.39 | 22 19 52.3 | 19 56.5 | 7.8028 | 8.100 | 3.03 | 2.90 |
| 14 6 0.8 | 74 | 5 31 43.64 | 31 45.86 | 22 20 10.6 | 20 14.8 | 7.8240 | 8.105 | 3.03 | 2.89 |
| 15 5 57.0 | 75 | 5 31 53.45 | 31 55.79 | 22 20 29.1 | 20 33.4 | 7.8443 | 8.110 | 3.02 | 2.87 |
| 16 5 53.3 | 76 | 5 32 3.73 | 32 6.18 | 22 20 47.8 | 20 52.1 | 7.8633 | 8.115 | 3.02 | 2.86 |
| 17 5 49.5 | 77 | 5 32 14.48 | 32 17.01 | 22 21 6.7 | 21 11.1 | 7.8814 | 8.120 | 3.02 | 2.84 |
| 18 5 45.8 | 78 | 5 32 25.67 | 32 28.29 | 22 21 25.9 | 21 30.3 | 7.8988 | 8.124 | 3.02 | 2.81 |
| 19 5 42.0 | 79 | 5 32 37.28 | 32 40.02 | 22 21 45.3 | 21 49.8 | 7.9151 | 8.128 | 3.01 | 2.79 |
| 20 5 38.3 | 80 | 5 32 49.33 | 32 52.18 | 22 22 4.9 | 22 9.4 | 7.9310 | 8.132 | 3.01 | 2.76 |
| 21 5 34.6 | 81 | 5 33 1.82 | 33 4.77 | 22 22 24.6 | 22 29.2 | 7.9459 | 8.136 | 3.01 | 2.74 |
| 22 5 30.9 | 82 | 5 33 14.74 | 33 17.79 | 22 22 44.5 | 22 49.1 | 7.9604 | 8.140 | 3.01 | 2.71 |
| 23 5 27.2 | 83 | 5 33 28.09 | 33 31.24 | 22 23 4.5 | 23 9.1 | 7.9742 | 8.143 | 3.01 | 2.68 |
| 24 5 23.5 | 84 | 5 33 41.86 | 33 45.11 | 22 23 24.5 | 23 29.2 | 7.9874 | 8.146 | 3.00 | 2.64 |
| 25 5 19.8 | 85 | 5 33 56.05 | 33 59.40 | 22 23 44.8 | 23 49.5 | 8.0003 | 8.149 | 3.00 | 2.61 |
| 26 5 16.1 | 86 | 5 34 10.67 | 34 14.12 | 22 24 5.2 | 24 9.9 | 8.0125 | 8.152 | 3.00 | 2.58 |
| 27 5 12.4 | 87 | 5 34 25.70 | 34 29.26 | 22 24 25.7 | 24 30.4 | 8.0243 | 8.155 | 3.00 | 2.54 |
| 28 5 8.7 | 88 | 5 34 41.15 | 34 44.80 | 22 24 46.2 | 24 51.0 | 8.0357 | 8.157 | 2.99 | 2.50 |
| 29 5 5.0 | 89 | 5 34 57.00 | 35 0.74 | 22 25 6.9 | 25 11.7 | 8.0469 | 8.159 | 2.99 | 2.46 |
| 30 5 1.4 | 90 | 5 35 13.25 | 35 17.09 | 22 25 27.6 | 25 32.5 | 8.0579 | 8.161 | 2.98 | 2.42 |
| 31 4 57.7 | 91 | 5 35 29.90 | 35 33.84 | 22 25 48.5 | 25 53.4 | 8.0683 | 8.163 | 2.98 | +2.38 |
| Apr. 1 4 54.1 | 92 | 5 35 46.96 | 35 51.00 | 22 26 9.5 | 26 14.4 | 8.0784 | 8.162 | 2.98 | |
| 2 4 50.4 | 93 | 5 36 4.42 | 36 8.56 | 22 26 30.5 | 26 35.4 | 8.0882 | 8.162 | 2.97 | |
| 3 4 46.8 | 94 | 5 36 22.26 | 36 26.50 | 22 26 51.5 | 26 56.4 | 8.0977 | 8.162 | 2.97 | |
| 4 4 43.2 | 95 | 5 36 40.48 | 36 44.82 | 22 27 12.6 | 27 17.5 | 8.1069 | 8.162 | 2.96 | |
| 5 4 39.5 | 96 | 5 36 59.09 | 37 3.51 | 22 27 33.6 | 27 38.5 | 8.1158 | 8.162 | 2.96 | |
| 6 4 35.9 | 97 | 5 37 18.08 | 37 22.58 | 22 27 54.6 | 27 59.5 | 8.1244 | 8.162 | 2.95 | |
| 7 4 32.3 | 98 | 5 37 37.44 | 37 42.03 | 22 28 15.6 | 28 20.5 | 8.1327 | 8.161 | 2.94 | |
| 8 4 28.7 | 99 | 5 37 57.16 | 38 1.84 | 22 28 36.6 | 28 41.5 | 8.1407 | 8.160 | 2.94 | |
| 9 4 25.1 | 100 | 5 38 17.24 | 38 22.01 | 22 28 57.6 | 29 2.5 | 8.1485 | 8.159 | 2.93 | |
| 10 4 21.5 | 101 | 5 88 37.68 | 38 42.54 | 22 29 18.5 | 29 23.4 | 8.1560 | 8.158 | 2.92 | −2.38 |
| 11 4 18.0 | 102 | 5 38 58.48 | 39 3.43 | 22 29 39.2 | 29 44.1 | 8.1632 | 8.157 | 2.92 | 2.41 |
| 12 4 14.4 | 103 | 5 89 19.62 | 39 24.66 | 22 29 59.9 | 30 4.8 | 8.1702 | 8.156 | 2.91 | 2.44 |
| 13 4 10.8 | 104 | 5 39 41.10 | 39 46.22 | 22 30 20.6 | 30 25.4 | 8.1770 | 8.155 | 2.91 | 2.47 |
| 14 4 7.2 | 105 | 5 40 2.92 | 40 8.12 | 22 30 41.1 | 30 45.9 | 8.1836 | 8.154 | 2.90 | 2.50 |
| 15 4 3.7 | 106 | 5 40 25.07 | 40 30.35 | 22 31 1.6 | 31 6.4 | 8.1900 | 8.152 | 2.90 | 2.53 |
| 16 4 0.1 | 107 | 5 40 47.55 | 40 52.92 | 22 31 21.9 | 31 26.7 | 8.1962 | 8.150 | 2.89 | 2.55 |
| 17 3 56.6 | 108 | 5 41 10.36 | 41 15.81 | 22 31 42.1 | 31 46.9 | 8.2023 | 8.147 | 2.88 | 2.57 |
| 18 3 53.1 | 109 | 5 41 33.48 | 41 39.01 | 22 32 2.2 | 32 6.9 | 8.2083 | 8.144 | 2.88 | 2.59 |
| 19 3 49.6 | 110 | 5 41 56.91 | 42 2.52 | 22 32 22.1 | 32 26.8 | 8.2142 | 8.141 | 2.87 | 2.61 |
| 20 3 46.0 | 111 | 5 42 20.65 | 42 26.34 | 22 32 41.8 | 32 46.5 | 8.2199 | 8.137 | 2.86 | 2.63 |
| 21 3 42.5 | 112 | 5 42 44.70 | 42 50.47 | 22 33 1.4 | 33 6.1 | 8.2255 | 8.133 | 2.85 | 2.64 |
| 22 3 39.0 | 113 | 5 43 9.05 | 43 14.91 | 22 33 20.8 | 33 25.5 | 8.2309 | 8.128 | 2.84 | 2.65 |
| 23 3 35.4 | 114 | 5 43 33.70 | 43 39.63 | 22 33 40.1 | 33 44.7 | 8.2361 | 8.123 | 2.83 | 2.66 |
| 24 3 31.9 | 115 | 5 43 58.63 | 44 4.64 | 22 33 59.1 | 34 3.8 | 8.2411 | 8.118 | 2.82 | 2.67 |
| 25 3 28.4 | 116 | 5 44 23.85 | 44 29.94 | 22 34 17.8 | 34 22.3 | 8.2459 | 8.112 | 2.81 | 2.68 |
| 26 3 24.9 | 117 | 5 44 49.36 | 44 55.52 | 22 34 36.3 | 34 40.8 | 8.2507 | 8.106 | 2.80 | 2.70 |
| 27 3 21.4 | 118 | 5 45 15.15 | 45 21.38 | 22 34 54.7 | 34 59.1 | 8.2553 | 8.100 | 2.80 | 2.72 |
| 28 3 17.9 | 119 | 5 45 41.20 | 45 47.51 | 22 35 12.9 | 35 17.2 | 8.2598 | 8.094 | 2.79 | 2.74 |
| 29 3 14.4 | 120 | 5 46 7.52 | 46 13.91 | 22 35 30.8 | 35 35.0 | 8.2642 | 8.088 | 2.79 | 2.76 |
| 30 3 10.9 | 121 | 5 46 34.12 | 46 40.57 | 22 35 48.3 | 35 52.5 | 8.2685 | 8.081 | 2.78 | 2.78 |
| 31 3 7.4 | 122 | 5 47 0.98 | 47 7.50 | +22 36 5.5 | 36 9.7 | +8.2727 | + 8.074 | +2.77 | −2.79 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| May 1 3 7.4 | 122 | 5 47 0.98 | 47 7.50 | +22 36 5.5 | 36 9.7 | +8.2727 | + 8.074 | +2.77 | −2.79 |
| 2 3 4.0 | 123 | 5 47 28.09 | 47 34.68 | 22 36 22.5 | 36 26.6 | 8.2768 | 8.067 | 2.76 | 2.80 |
| 3 3 0.5 | 124 | 5 47 55.45 | 48 2.11 | 22 36 39.3 | 36 43.3 | 8.2807 | 8.060 | 2.76 | 2.81 |
| 4 2 57.0 | 125 | 5 48 23.06 | 48 29.79 | 22 36 55.7 | 36 59.7 | 8.2845 | 8.052 | 2.75 | 2.82 |
| 5 2 53.5 | 126 | 5 48 50.92 | 48 57.72 | 22 37 11.8 | 37 15.7 | 8.2882 | 8.044 | 2.74 | 2.83 |
| 6 2 50.1 | 127 | 5 49 19.02 | 49 25.88 | 22 37 27.6 | 37 31.4 | 8.2918 | 8.035 | 2.73 | 2.84 |
| 7 2 46.6 | 128 | 5 49 47.35 | 49 54.27 | 22 37 43.0 | 37 46.8 | 8.2953 | 8.026 | 2.72 | 2.84 |
| 8 2 43.2 | 129 | 5 50 15.89 | 50 22.88 | 22 37 58.1 | 38 1.8 | 8.2987 | 8.016 | 2.72 | 2.85 |
| 9 2 39.7 | 130 | 5 50 44.65 | 50 51.70 | 22 38 12.8 | 38 16.4 | 8.3020 | 8.006 | 2.71 | 2.85 |
| 10 2 36.3 | 131 | 5 51 13.62 | 51 20.73 | 22 38 27.2 | 38 30.7 | 8.3052 | 7.995 | 2.70 | 2.86 |
| 11 2 32.8 | 132 | 5 51 42.81 | 51 49.98 | 22 38 41.3 | 38 44.7 | 8.3083 | 7.984 | 2.69 | 2.87 |
| 12 2 29.4 | 133 | 5 52 12.21 | 52 19.43 | 22 38 55.0 | 38 58.3 | 8.3113 | 7.972 | 2.68 | 2.88 |
| 13 2 25.9 | 134 | 5 52 41.80 | 52 49.08 | 22 39 8.2 | 39 11.4 | 8.3143 | 7.959 | 2.68 | 2.88 |
| 14 2 22.5 | 135 | 5 53 11.58 | 53 18.92 | 22 39 21.0 | 39 24.1 | 8.3172 | 7.945 | 2.67 | 2.89 |
| 15 2 19.1 | 136 | 5 53 41.55 | 53 48.96 | 22 39 33.4 | 39 36.4 | 8.3200 | 7.930 | 2.66 | 2.90 |
| 16 2 15.6 | 137 | 5 54 11.71 | 54 19.18 | 22 39 45.4 | 39 48.3 | 8.3227 | 7.915 | 2.65 | 2.92 |
| 17 2 12.2 | 138 | 5 54 42.06 | 54 49.58 | 22 39 57.0 | 39 59.8 | 8.3253 | 7.898 | 2.64 | 2.93 |
| 18 2 8.8 | 139 | 5 55 12.57 | 55 20.14 | 22 40 8.1 | 40 10.9 | 8.3278 | 7.881 | 2.63 | 2.95 |
| 19 2 5.4 | 140 | 5 55 43.24 | 55 50.86 | 22 40 18.9 | 40 21.5 | 8.3302 | 7.861 | 2.62 | 2.96 |
| 20 2 1.9 | 141 | 5 56 14.08 | 56 21.76 | 22 40 29.2 | 40 31.7 | 8.3326 | 7.842 | 2.61 | 2.98 |
| 21 1 58.5 | 142 | 5 56 45.10 | 56 52.84 | 22 40 39.1 | 40 41.4 | 8.3349 | 7.822 | 2.60 | 2.99 |
| 22 1 55.1 | 143 | 5 57 16.29 | 57 24.08 | 22 40 48.5 | 40 50.7 | 8.3371 | 7.801 | 2.59 | 3.00 |
| 23 1 51.7 | 144 | 5 57 47.68 | 57 55.46 | 22 40 57.4 | 40 59.5 | 8.3392 | 7.780 | 2.58 | 3.01 |
| 24 1 48.3 | 145 | 5 58 19.11 | 58 26.98 | 22 41 5.9 | 41 7.9 | 8.3411 | 7.759 | 2.57 | 3.02 |
| 25 1 44.9 | 146 | 5 58 50.74 | 58 58.65 | 22 41 14.1 | 41 16.0 | 8.3429 | 7.732 | 2.56 | 3.03 |
| 26 1 41.5 | 147 | 5 59 22.51 | 59 30.47 | 22 41 21.8 | 41 23.6 | 8.3447 | 7.703 | 2.55 | 3.04 |
| 27 1 38.1 | 148 | 5 59 54.42 | 60 2.43 | 22 41 28.9 | 41 30.6 | 8.3464 | 7.674 | 2.53 | 3.05 |
| 28 1 34.7 | 149 | 6 0 26.45 | 0 34.50 | 22 41 35.6 | 41 37.1 | 8.3481 | 7.645 | 2.52 | 3.06 |
| 29 1 31.3 | 150 | 6 0 58.60 | 1 6.69 | 22 41 41.7 | 41 43.1 | 8.3498 | 7.611 | 2.50 | 3.07 |
| 30 1 27.9 | 151 | 6 1 30.88 | 1 39 01 | 22 41 47.4 | 41 48.7 | 8.3514 | 7.572 | 2.49 | 3.08 |
| 31 1 24.5 | 152 | 6 2 3.29 | 2 11.46 | 22 41 52.6 | 41 53.8 | 8.3530 | 7.530 | 2.47 | 3.08 |
| June 1 1 21.1 | 153 | 6 2 35.81 | 2 44.02 | 22 41 57.3 | 41 58.3 | 8.3545 | 7.484 | 2.45 | 3.09 |
| 2 1 17.7 | 154 | 6 3 8.43 | 3 16.68 | 22 42 1.4 | 42 2.3 | 8.3559 | 7.431 | 2.42 | 3.09 |
| 3 1 14.3 | 155 | 6 3 41.14 | 3 49.43 | 22 42 5.1 | 42 5.9 | 8.3572 | 7.372 | 2.40 | 3.10 |
| 4 1 10.9 | 156 | 6 4 13.96 | 4 22.28 | 22 42 8.4 | 42 9.1 | 8.3584 | 7.302 | 2.38 | 3.10 |
| 5 1 7.5 | 157 | 6 4 46.88 | 4 55.24 | 22 42 11.2 | 42 11.8 | 8.3596 | 7.220 | 2.36 | 3.10 |
| 6 1 4.2 | 158 | 6 5 19.90 | 5 28.29 | 22 42 13.4 | 42 13.9 | 8.3607 | 7.119 | 2.33 | 3.11 |
| 7 1 0.8 | 159 | 6 5 52.99 | 6 1.41 | 22 42 15.1 | 42 15.4 | 8.3618 | 6.964 | 2.31 | 3.11 |
| 8 0 57.4 | 160 | 6 6 26.15 | 6 34.61 | 22 42 16.3 | 42 16.4 | 8.3628 | 6.743 | 2.28 | 3.12 |
| 9 0 54.0 | 161 | 6 6 59.39 | 7 7.88 | 22 42 16.8 | 42 16.9 | 8.3637 | + 6.317 | 2.26 | 3.12 |
| 10 0 50.6 | 162 | 6 7 32.70 | 7 41.22 | 22 42 16.8 | 42 16.8 | 8.3646 | − 6.141 | 2.22 | 3.13 |
| 11 0 47.3 | 163 | 6 8 6.08 | 8 14.63 | 22 42 16.3 | 42 16.1 | 8.3654 | 6.685 | 2.19 | 3.14 |
| 12 0 43.9 | 164 | 6 8 39.51 | 8 48.09 | 22 42 15.3 | 42 14.9 | 8.3661 | 6.919 | 2.15 | 3.14 |
| 13 0 40.5 | 165 | 6 9 12.99 | 9 21.60 | 22 42 13.8 | 42 13.3 | 8.3667 | 7.070 | +2.12 | 3.15 |
| 14 0 37.1 | 166 | 6 9 46.51 | 9 55.15 | 22 42 11.9 | 42 11.3 | 8.3673 | 7.182 | | 3.16 |
| 15 0 33.8 | 167 | 6 10 20.08 | 10 28.73 | 22 42 9.4 | 42 8.7 | 8.3679 | 7.271 | | 3.17 |
| 16 0 30.4 | 168 | 6 10 53.69 | 11 2.36 | 22 42 6.3 | 42 5.5 | 8.3684 | 7.350 | | 3.17 |
| 17 0 27.0 | 169 | 6 11 27.34 | 11 36.03 | 22 42 2.8 | 42 1.8 | 8.3689 | 7.420 | | 3.18 |
| 18 0 23.6 | 170 | 6 12 1.08 | 12 9.75 | 22 41 58.7 | 41 57.6 | 8.3693 | 7.474 | | 3.18 |
| 19 0 20.3 | 171 | 6 12 34.76 | 12 43.50 | 22 41 54.2 | 41 52.9 | 8.3696 | 7.521 | | 3.19 |
| 20 0 16.9 | 172 | 6 13 8.58 | 13 17.28 | 22 41 49.0 | 41 47.7 | 8.3699 | 7.564 | | 3.20 |
| 21 0 13.5 | 173 | 6 13 42.31 | 13 51.08 | 22 41 43.4 | 41 41.9 | 8.3702 | 7.606 | | 3.20 |
| 22 0 10.2 | 174 | 6 14 16.10 | 14 24.88 | 22 41 37.2 | 41 35.6 | 8·3704 | 7.646 | | 3.21 |
| 23 0 6.8 | 175 | 6 14 49.89 | 14 58.69 | 22 41 30.6 | 41 28.8 | 8.3705 | 7.679 | | 3.21 |
| 24 0 3.4 | 176 | 6 15 23.69 | 15 32.50 | 22 41 23.5 | 41 21.6 | 8.3705 | 7.709 | | 3.22 |
| 25 0 0.1 | 177 | 6 15 57.50 | 16 6.32 | 22 41 15.8 | 41 13.8 | 8.3705 | 7.738 | | 3.22 |
| 25 23 56.7 | 178 | 6 16 31.31 | 16 40.15 | 22 41 7.5 | 41 5.4 | 8.3705 | 7.767 | | 3.22 |
| 26 23 53.3 | 179 | 6 17 5.11 | 17 13.96 | 22 40 58.8 | 40 56.5 | 8.3704 | 7.794 | | 3.22 |
| 27 23 49.9 | 180 | 6 17 38.89 | 17 47.75 | 22 40 49.6 | 40 47.1 | 8.3703 | 7.818 | | 3.22 |
| 28 23 46.6 | 181 | 6 18 12.66 | 18 21.53 | 22 40 39.9 | 40 37.3 | 8.3701 | 7.840 | | 3.22 |
| 29 23 43.2 | 182 | 6 18 46.43 | 18 55.31 | 22 40 29.6 | 40 26.9 | 8.3699 | 7.860 | | 3.22 |
| 30 23 39.8 | 183 | 6 19 20.18 | 19 29.06 | +22 40 18 9 | 40 15.9 | +8.3695 | − 7.881 | −2.16 | −3.21 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| July 1 23 36.5 | 184 | 6 19 53.90 | 20 2.79 | +22 40 7.6 | 40 4.5 | +8.3690 | − 7.901 | −2.16 | −3.19 |
| 2 23 33.1 | 185 | 6 20 27.56 | 20 36.45 | 22 39 55.9 | 39 52.7 | 8.3685 | 7.920 | 2.17 | 3.17 |
| 3 23 29.7 | 186 | 6 21 1.16 | 21 10.05 | 22 39 43.5 | 39 40.3 | 8.3680 | 7.937 | 2.19 | 3.14 |
| 4 23 26.4 | 187 | 6 21 34.73 | 21 43.62 | 22 39 30.8 | 39 27.4 | 8.3674 | 7.952 | 2.20 | 3.12 |
| 5 23 23.0 | 188 | 6 22 8.27 | 22 17.16 | 22 39 17.7 | 39 14.2 | 8.3667 | 7.966 | 2.22 | 3.09 |
| 6 23 19.6 | 189 | 6 22 41.74 | 22 50.63 | 22 39 4.0 | 39 0.4 | 8.3659 | 7.980 | 2.24 | 3.07 |
| 7 23 16.2 | 190 | 6 23 15.14 | 23 24.03 | 22 38 49.9 | 38 46.2 | 8.3651 | 7.994 | 2.25 | 3.05 |
| 8 23 12.8 | 191 | 6 23 48.49 | 23 57.38 | 22 38 35.3 | 38 31.4 | 8.3642 | 8.007 | 2.27 | 3.04 |
| 9 23 9.5 | 192 | 6 24 21.78 | 24 30.66 | 22 38 20.4 | 38 16.3 | 8.3633 | 8.019 | 2.28 | 3.02 |
| 10 23 6.1 | 193 | 6 24 55.01 | 25 3.88 | 22 38 4.7 | 38 0.5 | 8.3624 | 8.031 | 2.30 | 3.01 |
| 11 23 2.7 | 194 | 6 25 28.14 | 25 37.00 | 22 37 48.7 | 37 44.4 | 8.3614 | 8.043 | 2.32 | 3.00 |
| 12 22 59.3 | 195 | 6 26 1.19 | 26 10.04 | 22 37 32.3 | 37 27.9 | 8.3604 | 8.055 | 2.33 | 2.99 |
| 13 22 55.9 | 196 | 6 26 34.16 | 26 42.99 | 22 37 15.5 | 37 10.9 | 8.3593 | 8.066 | 2.35 | 2.98 |
| 14 22 52.5 | 197 | 6 27 7.05 | 27 15.87 | 22 36 58.2 | 36 53.5 | 8.3581 | 8.078 | 2.37 | 2.97 |
| 15 22 49.2 | 198 | 6 27 39.84 | 27 48.64 | 22 36 40.4 | 36 35.5 | 8.3567 | 8.089 | 2.38 | 2.96 |
| 16 22 45.8 | 199 | 6 28 12.52 | 28 21.31 | 22 36 22.2 | 36 17.2 | 8.3553 | 8.100 | 2.40 | 2.95 |
| 17 22 42.4 | 200 | 6 28 45.11 | 28 53.89 | 22 36 3.6 | 35 58.5 | 8.3539 | 8.111 | 2.42 | 2.95 |
| 18 22 39.0 | 201 | 6 29 17.60 | 29 26.36 | 22 35 44.5 | 35 39.3 | 8.3524 | 8.122 | 2.43 | 2.95 |
| 19 22 35.6 | 202 | 6 29 49.97 | 29 58.71 | 22 35 25.0 | 35 19.6 | 8.3509 | 8.133 | 2.45 | 2.95 |
| 20 22 32.2 | 203 | 6 30 22.23 | 30 30.94 | 22 35 5.2 | 34 59.7 | 8.3492 | 8.143 | 2.47 | 2.94 |
| 21 22 28.8 | 204 | 6 30 54.35 | 31 3.05 | 22 34 45.0 | 34 39.4 | 8.3475 | 8.152 | 2.48 | 2.94 |
| 22 22 25.4 | 205 | 6 31 26.36 | 31 35.04 | 22 34 24.4 | 34 18.7 | 8.3458 | 8.160 | 2.50 | 2.94 |
| 23 22 22.0 | 206 | 6 31 58.25 | 32 6.90 | 22 34 3.5 | 33 57.7 | 8.3440 | 8.167 | 2.52 | 2.93 |
| 24 22 18.6 | 207 | 6 32 30.00 | 32 38.63 | 22 33 42.3 | 33 36.4 | 8.3421 | 8.173 | 2.53 | 2.93 |
| 25 22 15.2 | 208 | 6 33 1.62 | 33 10.22 | 22 33 20.7 | 33 14.7 | 8.3402 | 8.179 | 2.55 | 2.92 |
| 26 22 11.8 | 209 | 6 33 33.08 | 33 41.65 | 22 32 58.8 | 32 52.7 | 8.3382 | 8.185 | 2.56 | 2.92 |
| 27 22 8.4 | 210 | 6 34 4.40 | 34 12.95 | 22 32 36.6 | 32 30.4 | 8.3362 | 8.191 | 2.58 | 2.91 |
| 28 22 4.9 | 211 | 6 34 35.58 | 34 44.09 | 22 32 14.2 | 32 7.9 | 8.3340 | 8.197 | 2.59 | 2.90 |
| 29 22 1.5 | 212 | 6 35 6.61 | 35 15.09 | 22 31 51.4 | 31 45.1 | 8.3320 | 8.203 | 2.61 | 2.89 |
| 30 21 58.1 | 213 | 6 35 37.48 | 35 45.92 | 22 31 28.3 | 31 21.9 | 8.3299 | 8.208 | 2.62 | 2.87 |
| 31 21 54.7 | 214 | 6 36 8.17 | 36 16.57 | 22 31 4.9 | 30 58.4 | 8.3275 | 8.213 | 2.63 | 2.86 |
| Aug. 1 21 51.3 | 215 | 6 36 38.68 | 36 47.04 | 22 30 41.2 | 30 34.6 | 8.3250 | 8.218 | 2.65 | 2.84 |
| 2 21 47.8 | 216 | 6 37 9.02 | 37 17.33 | 22 30 17.4 | 30 10.7 | 8.3224 | 8.223 | 2.66 | 2.82 |
| 3 21 44.4 | 217 | 6 37 39.18 | 37 47.45 | 22 29 53.3 | 29 46.6 | 8.3196 | 8.227 | 2.67 | 2.79 |
| 4 21 41.0 | 218 | 6 38 9.15 | 38 17.38 | 22 29 28.9 | 29 22.1 | 8.3168 | 8.231 | 2.68 | 2.76 |
| 5 21 37.5 | 219 | 6 38 38.92 | 38 47.11 | 22 29 4.3 | 28 57.4 | 8.3140 | 8.235 | 2.69 | 2.73 |
| 6 21 34.1 | 220 | 6 39 8.49 | 39 16.63 | 22 28 39.5 | 28 32.5 | 8.3111 | 8.239 | 2.70 | 2.70 |
| 7 21 30.7 | 221 | 6 39 37.87 | 39 45.97 | 22 28 14.4 | 28 7.4 | 8.3081 | 8.243 | 2.71 | 2.66 |
| 8 21 27.2 | 222 | 6 40 7.05 | 40 15.11 | 22 27 49.0 | 27 41.9 | 8.3050 | 8.246 | 2.72 | 2.62 |
| 9 21 23.8 | 223 | 6 40 36.03 | 40 44.04 | 22 27 23.5 | 27 16.4 | 8.3019 | 8.249 | 2.73 | 2.57 |
| 10 21 20.3 | 224 | 6 41 4.78 | 41 12.74 | 22 26 57.9 | 26 50.7 | 8.2987 | 8.251 | 2.74 | 2.53 |
| 11 21 16.9 | 225 | 6 41 33.30 | 41 41.21 | 22 26 32.2 | 26 25.0 | 8.2954 | 8.253 | 2.74 | 2.48 |
| 12 21 13.4 | 226 | 6 42 1.61 | 42 9.47 | 22 26 6.4 | 25 59.1 | 8.2920 | 8.255 | 2.75 | 2.44 |
| 13 21 9.9 | 227 | 6 42 29.70 | 42 37.50 | 22 25 40.4 | 25 33.1 | 8.2884 | 8.257 | 2.76 | 2.40 |
| 14 21 6.4 | 228 | 6 42 57.57 | 43 5.31 | 22 25 14.3 | 25 7.0 | 8.2847 | 8.259 | 2.77 | 2.36 |
| 15 21 3.0 | 229 | 6 43 25.19 | 43 32.87 | 22 24 48.1 | 24 40.7 | 8.2810 | 8.261 | 2.78 | −2.33 |
| 16 20 59.5 | 230 | 6 43 52.56 | 44 0.18 | 22 24 21.8 | 24 14.3 | 8.2772 | 8.263 | 2.78 | |
| 17 20 56.0 | 231 | 6 44 19.69 | 44 27.25 | 22 23 55.6 | 23 48.1 | 8.2732 | 8.265 | 2.79 | |
| 18 20 52.5 | 232 | 6 44 46.58 | 44 54.09 | 22 23 29.4 | 23 21.9 | 8.2691 | 8.266 | 2.80 | |
| 19 20 49.0 | 233 | 6 45 13.22 | 45 20.67 | 22 23 3.0 | 22 55.6 | 8.2649 | 8.267 | 2.81 | |
| 20 20 45.6 | 234 | 6 45 39.60 | 45 46.97 | 22 22 36.4 | 22 28.9 | 8.2607 | 8.267 | 2.82 | |
| 21 20 42.1 | 235 | 6 46 5.73 | 46 13.03 | 22 22 9.7 | 22 2.2 | 8.2564 | 8.266 | 2.82 | |
| 22 20 38.6 | 236 | 6 46 31.59 | 46 38.82 | 22 21 42.8 | 21 35.4 | 8.2519 | 8.266 | 2.83 | |
| 23 20 35.1 | 237 | 6 46 57.16 | 47 4.83 | 22 21 16.1 | 21 8.6 | 8.2472 | 8.265 | 2.84 | |
| 24 20 31.6 | 238 | 6 47 22.46 | 47 29.57 | 22 20 49.5 | 20 42.0 | 8.2423 | 8.265 | 2.85 | |
| 25 20 28.0 | 239 | 6 47 47.48 | 47 54.50 | 22 20 22.9 | 20 15.4 | 8.2374 | 8.264 | 2.86 | +2.38 |
| 26 20 24.5 | 240 | 6 48 12.19 | 48 19.14 | 22 19 56.4 | 19 49.0 | 8.2324 | 8.263 | 2.86 | 2.42 |
| 27 20 21.0 | 241 | 6 48 36.64 | 48 43.51 | 22 19 30.0 | 19 22.5 | 8.2272 | 8.262 | 2.87 | 2.46 |
| 28 20 17.5 | 242 | 6 49 0.79 | 49 7.59 | 22 19 3.6 | 18 56.2 | 8.2218 | 8.261 | 2.88 | 2.50 |
| 29 20 13.9 | 243 | 6 49 24.64 | 49 31.86 | 22 18 37.3 | 18 29.9 | 8.2162 | 8.259 | 2.89 | 2.54 |
| 30 20 10.4 | 244 | 6 49 48.18 | 49 54.82 | 22 18 11.1 | 18 3.7 | 8.2106 | 8.257 | 2.89 | 2.58 |
| 31 20 6.8 | 245 | 6 50 11.40 | 50 17.96 | +22 17 45.2 | 17 37.8 | +8.2048 | − 8.255 | −2.89 | +2.61 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Sept. 1 20 3.3 | 246 | 6 50 34.34 | 50 40.82 | +22 17 19.3 | 17 11.9 | +8.1988 | − 8.253 | −2.90 | +2.64 |
| 2 19 59.7 | 247 | 6 50 56.94 | 51 3.38 | 22 16 53 6 | 16 46.2 | 8.1926 | 8.250 | 2.91 | 2.67 |
| 3 19 56.2 | 248 | 6 51 19.21 | 51 25.57 | 22 16 28.0 | 16 20.6 | 8.1863 | 8.247 | 2.91 | 2.70 |
| 4 19 52.6 | 249 | 6 51 41.15 | 51 47.38 | 22 16 2.6 | 15 55.3 | 8.1796 | 8.244 | 2.92 | 2.74 |
| 5 19 49.0 | 250 | 6 52 2.75 | 52 8.89 | 22 15 37.4 | 15 30.2 | 8.1727 | 8.241 | 2.92 | 2.77 |
| 6 19 45.4 | 251 | 6 52 24.01 | 52 30.06 | 22 15 12.5 | 15 5.4 | 8.1656 | 8.237 | 2.92 | 2.80 |
| 7 19 41.9 | 252 | 6 52 44.94 | 52 50.90 | 22 14 48.0 | 14 40.8 | 8.1585 | 8.233 | 2.93 | 2.82 |
| 8 19 38.3 | 253 | 6 53 5.52 | 53 11.39 | 22 14 23.5 | 14 16.4 | 8.1513 | 8.228 | 2.93 | 2.84 |
| 9 19 34.7 | 254 | 6 53 25.75 | 53 31.52 | 22 13 59.3 | 13 52.3 | 8.1438 | 8.223 | 2.94 | 2.86 |
| 10 19 31.1 | 255 | 6 53 45.62 | 53 51.29 | 22 13 35.3 | 13 28.5 | 8.1361 | 8.218 | 2.94 | 2.88 |
| 11 19 27.5 | 256 | 6 54 5.15 | 54 10.72 | 22 13 11.8 | 13 5.1 | 8.1280 | 8.212 | 2.94 | 2.90 |
| 12 19 23.9 | 257 | 6 54 24.30 | 54 29.77 | 22 12 48.6 | 12 42.0 | 8.1197 | 8.206 | 2.95 | 2.92 |
| 13 19 20.2 | 258 | 6 54 43.10 | 54 48.46 | 22 12 25.6 | 12 19.1 | 8.1113 | 8.200 | 2.95 | 2.94 |
| 14 19 16.6 | 259 | 6 55 1.52 | 55 6.78 | 22 12 2.9 | 11 56.5 | 8.1027 | 8.193 | 2.96 | 2.96 |
| 15 19 13.0 | 260 | 6 55 19.56 | 55 24.72 | 22 11 40.6 | 11 34.3 | 8.0939 | 8.186 | 2.96 | 2.98 |
| 16 19 9.3 | 261 | 6 55 37.25 | 55 42.31 | 22 11 18.6 | 11 12.3 | 8.0847 | 8.179 | 2.97 | 3.00 |
| 17 19 5.7 | 262 | 6 55 54.56 | 55 59.51 | 22 10 56.9 | 10 50.8 | 8.0752 | 8.172 | 2.97 | 3.02 |
| 18 19 2.0 | 263 | 6 56 11.48 | 56 16.32 | 22 10 35.7 | 10 29.7 | 8.0647 | 8.165 | 2.98 | 3.03 |
| 19 18 58.4 | 264 | 6 56 28.01 | 56 32.74 | 22 10 14.9 | 10 8.9 | 8.0542 | 8.157 | 2.98 | 3.04 |
| 20 18 54.7 | 265 | 6 56 44.14 | 56 48.76 | 22 9 54.4 | 9 48.5 | 8.0435 | 8.148 | 2.98 | 3.06 |
| 21 18 51.0 | 266 | 6 56 59.86 | 57 4.37 | 22 9 34.5 | 9 28.7 | 8.0324 | 8.138 | 2.99 | 3.07 |
| 22 18 47.4 | 267 | 6 57 15.19 | 57 19.59 | 22 9 15.1 | 9 9.4 | 8.0211 | 8.128 | 2.99 | 3.08 |
| 23 18 43.7 | 268 | 6 57 30.11 | 57 34.41 | 22 8 56.0 | 8 50.5 | 8.0098 | 8.117 | 3.00 | 3.09 |
| 24 18 40.0 | 269 | 6 57 44.63 | 57 48.81 | 22 8 37.4 | 8 32.0 | 7.9972 | 8.106 | 3.00 | 3.10 |
| 25 18 36.3 | 270 | 6 57 58.73 | 58 2.79 | 22 8 19.2 | 8 13.9 | 7.9844 | 8.094 | 3.00 | 3.10 |
| 26 18 32.6 | 271 | 6 58 12.41 | 58 16.35 | 22 8 1.5 | 7 56.4 | 7.9710 | 8.082 | 3.01 | 3.11 |
| 27 18 28.9 | 272 | 6 58 25.67 | 58 29.49 | 22 7 44.3 | 7 39.3 | 7.9572 | 8.070 | 3.01 | 3.12 |
| 28 18 25.2 | 273 | 6 58 38.49 | 58 42.20 | 22 7 27.6 | 7 22.8 | 7.9432 | 8.058 | 3.02 | 3.13 |
| 29 18 21.4 | 274 | 6 58 50.88 | 58 54.46 | 22 7 11.5 | 7 6.8 | 7.9282 | 8.044 | 3.02 | 3.14 |
| 30 18 17.7 | 275 | 6 59 2.84 | 59 6.29 | 22 6 56.0 | 6 51.4 | 7.9120 | 8.028 | 3.02 | 3.14 |
| Oct. 1 18 14.0 | 276 | 6 59 14.38 | 59 17.70 | 22 6 41.1 | 6 36.6 | 7.8914 | 8.011 | 3.02 | 3.15 |
| 2 18 10.2 | 277 | 6 59 25.48 | 59 28.67 | 22 6 26.8 | 6 22.6 | 7.8782 | 7.992 | 3.02 | 3.16 |
| 3 18 6.5 | 278 | 6 59 36.12 | 59 39.19 | 22 6 13.0 | 6 9.0 | 7.8599 | 7.971 | 3.02 | 3.17 |
| 4 18 2.7 | 279 | 6 59 46.32 | 59 49.26 | 22 5 59.8 | 5 56.0 | 7.8408 | 7.951 | 3.02 | 3.18 |
| 5 17 58.9 | 280 | 6 59 56.07 | 59 58.89 | 22 5 47.2 | 5 43.6 | 7.8209 | 7.930 | 3.02 | 3.18 |
| 6 17 55.1 | 281 | 7 0 5.35 | 0 8.05 | 22 5 35.1 | 5 31.7 | 7.7994 | 7.909 | 3.02 | 3.19 |
| 7 17 51.3 | 282 | 7 0 14.20 | 0 16.76 | 22 5 23.6 | 5 20.4 | 7.7769 | 7.886 | 3.02 | 3.20 |
| 8 17 47.5 | 283 | 7 0 22.59 | 0 25.02 | 22 5 12.9 | 5 9.8 | 7.7532 | 7.862 | 3.02 | 3.20 |
| 9 17 43.8 | 284 | 7 0 30.53 | 0 32.82 | 22 5 2.8 | 4 59.9 | 7.7280 | 7.836 | 3.02 | 3.21 |
| 10 17 39.9 | 285 | 7 0 38.01 | 0 40.16 | 22 4 53.4 | 4 50.7 | 7.7013 | 7.804 | 3.02 | 3.21 |
| 11 17 36.1 | 286 | 7 0 45.03 | 0 47.05 | 22 4 44.7 | 4 42.2 | 7.6723 | 7.770 | 3.02 | 3.22 |
| 12 17 32.3 | 287 | 7 0 51.58 | 0 53.47 | 22 4 36.6 | 4 34.2 | 7.6418 | 7.733 | 3.02 | 3.22 |
| 13 17 28.5 | 288 | 7 0 57.66 | 0 59.42 | 22 4 29.2 | 4 27.0 | 7.6083 | 7.692 | 3.02 | 3.23 |
| 14 17 24.6 | 289 | 7 1 3.28 | 1 4.90 | 22 4 22.5 | 4 20.5 | 7.5720 | 7.647 | 3.02 | 3.23 |
| 15 17 20.8 | 290 | 7 1 8.43 | 1 9.92 | 22 4 16.5 | 4 14.7 | 7.5324 | 7.596 | 3.02 | 3.23 |
| 16 17 17.0 | 291 | 7 1 13.13 | 1 14.49 | 22 4 11.0 | 4 9.5 | 7.4898 | 7.539 | 3.02 | 3.23 |
| 17 17 13.1 | 292 | 7 1 17.35 | 1 18.57 | 22 4 6.3 | 4 4.9 | 7.4403 | 7.474 | 3.02 | 3.23 |
| 18 17 9.2 | 293 | 7 1 21.10 | 1 22.19 | 22 4 2.3 | 4 1.2 | 7.3857 | 7.397 | 3.02 | 3.23 |
| 19 17 5.4 | 294 | 7 1 24.37 | 1 25.31 | 22 3 59.1 | 3 58.2 | 7.3218 | 7.303 | 3.02 | 3.23 |
| 20 17 1.5 | 295 | 7 1 27.16 | 1 27.97 | 22 3 56.6 | 3 55.9 | 7.2469 | 7.183 | 3.02 | 3.23 |
| 21 16 57.6 | 296 | 7 1 29.44 | 1 30.12 | 22 3 54.8 | 3 54.3 | 7.1564 | 7.017 | 3.02 | 3.23 |
| 22 16 53.7 | 297 | 7 1 31.28 | 1 31.83 | 22 3 53.8 | 3 53.5 | 7.0418 | 6.744 | 3.02 | 3.23 |
| 23 16 49.8 | 298 | 7 1 32.62 | 1 33.03 | 22 3 53.5 | 3 53.4 | 6.8857 | − 5.840 | 3.02 | 3.23 |
| 24 16 45.8 | 299 | 7 1 33.49 | 1 33.75 | 22 3 54.0 | 3 54.1 | 6.6397 | + 6.686 | 3.02 | 3.23 |
| 25 16 41.9 | 300 | 7 1 33.88 | 1 34.01 | 22 3 55.1 | 3 55.4 | +5.9865 | 7.016 | 3.02 | 3.23 |
| 26 16 38.0 | 301 | 7 1 33.76 | 1 33.75 | 22 3 57.0 | 3 57.5 | −6.3845 | 7.202 | 3.02 | 3.23 |
| 27 16 34.0 | 302 | 7 1 33.18 | 1 33.03 | 22 3 59.7 | 4 0.4 | 6.7595 | 7.332 | 3.02 | 3.23 |
| 28 16 30.1 | 303 | 7 1 32.11 | 1 31.82 | 22 4 3.1 | 4 4.1 | 6.9610 | 7.420 | 3.02 | 3.23 |
| 29 16 26.1 | 304 | 7 1 30.55 | 1 30.11 | 22 4 7.3 | 4 8.6 | 7.0957 | 7.494 | 3.02 | 3.23 |
| 30 16 22.1 | 305 | 7 1 28.54 | 1 27.96 | 22 4 12.2 | 4 13.7 | 7.1983 | 7.564 | 3.02 | 3.23 |
| 31 16 18.2 | 306 | 7 1 26.04 | 1 25.32 | 22 4 17.8 | 4 19.5 | 7.2829 | 7.619 | 3.02 | 3.23 |
| 32 16 14.2 | 307 | 7 1 23.06 | 1 22.20 | +22 4 24.1 | 4 26.1 | −7.3523 | + 7.673 | −3.02 | +3.23 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Nov. 1 16 14.2 | 307 | 7 1 23.06 | 1 22.20 | +22 4 24.1 | 4 26.1 | −7.3523 | + 7.673 | −3.02 | +3.23 |
| 2 16 10.2 | 308 | 7 1 19.59 | 1 18.59 | 22 4 31.3 | 4 33.5 | 7.4121 | 7.721 | 3.02 | 3.23 |
| 3 16 6.2 | 309 | 7 1 15.65 | 1 14.52 | 22 4 39.2 | 4 41.6 | 7.4636 | 7.759 | 3.02 | 3.23 |
| 4 16 2.2 | 310 | 7 1 11.24 | 1 9.98 | 22 4 47.8 | 4 50.4 | 7.5097 | 7.795 | 3.02 | 3.23 |
| 5 15 58.2 | 311 | 7 1 6.34 | 1 4.94 | 22 4 57.1 | 4 59.9 | 7.5514 | 7.829 | 3.02 | 3.23 |
| 6 15 54.2 | 312 | 7 1 0.99 | 0 59.45 | 22 5 7.0 | 5 10.1 | 7.5894 | 7.861 | 3.02 | 3.23 |
| 7 15 50.1 | 313 | 7 0 55.16 | 0 53.48 | 22 5 17.8 | 5 21.1 | 7.6243 | 7.890 | 3.02 | 3.23 |
| 8 15 46.1 | 314 | 7 0 48.88 | 0 47.07 | 22 5 29.3 | 5 32.7 | 7.6560 | 7.916 | 3.02 | 3.23 |
| 9 15 42.0 | 315 | 7 0 42.15 | 0 40.21 | 22 5 41.5 | 5 45.1 | 7.6855 | 7.940 | 3.02 | 3.23 |
| 10 15 38.0 | 316 | 7 0 34.94 | 0 32.87 | 22 5 54.5 | 5 58.2 | 7.7126 | 7.963 | 3.02 | 3.22 |
| 11 15 33.9 | 317 | 7 0 27.28 | 0 25.08 | 22 6 8.2 | 6 12.1 | 7.7380 | 7.985 | 3.02 | 3.22 |
| 12 15 29.9 | 318 | 7 0 19.18 | 0 16.85 | 22 6 22.5 | 6 26.7 | 7.7621 | 8.008 | 3.02 | 3.21 |
| 13 15 25.8 | 319 | 7 0 10.63 | 0 8.18 | 22 6 37.5 | 6 41.8 | 7.7844 | 8.028 | 3.02 | 3.21 |
| 14 15 21.7 | 320 | 7 0 1.65 | 59 59.07 | 22 6 53.0 | 6 57.5 | 7.8056 | 8.047 | 3.02 | 3.20 |
| 15 15 17.6 | 321 | 6 59 52.23 | 59 49.52 | 22 7 9.3 | 7 14.0 | 7.8256 | 8.065 | 3.02 | 3.19 |
| 16 15 13.5 | 322 | 6 59 42.37 | 59 39.53 | 22 7 26.2 | 7 31.0 | 7.8451 | 8.083 | 3.01 | 3.18 |
| 17 15 9.4 | 323 | 6 59 32.07 | 59 29.11 | 22 7 43.7 | 7 48.8 | 7.8633 | 8.100 | 3.01 | 3.17 |
| 18 15 5.3 | 324 | 6 59 21.34 | 59 18.26 | 22 8 1.9 | 8 7.2 | 7.8807 | 8.114 | 3.01 | 3.16 |
| 19 15 1.2 | 325 | 6 59 10.19 | 59 6.99 | 22 8 20.6 | 8 26.1 | 7.8969 | 8.127 | 3.00 | 3.14 |
| 20 14 57.1 | 326 | 6 58 58.61 | 58 55.29 | 22 8 40.1 | 8 45.8 | 7.9127 | 8.139 | 2.99 | 3.13 |
| 21 14 52.9 | 327 | 6 58 46.62 | 58 43.18 | 22 9 0.2 | 9 6.0 | 7.9278 | 8.151 | 2.98 | 3.12 |
| 22 14 48.8 | 328 | 6 58 34.23 | 58 30.67 | 22 9 20.9 | 9 26.8 | 7.9425 | 8.163 | 2.97 | 3.11 |
| 23 14 44.7 | 329 | 6 58 21.44 | 58 17.77 | 22 9 42.1 | 9 48.2 | 7.9568 | 8.173 | 2.97 | 3.09 |
| 24 14 40.5 | 330 | 6 58 8.27 | 58 4.48 | 22 10 3.8 | 10 10.0 | 7.9695 | 8.183 | 2.96 | 3.07 |
| 25 14 36.3 | 331 | 6 57 54.70 | 57 50.79 | 22 10 26.0 | 10 32.4 | 7.9816 | 8.193 | 2.95 | 3.06 |
| 26 14 32.2 | 332 | 6 57 40.74 | 57 36.72 | 22 10 48.7 | 10 55.2 | 7.9932 | 8.203 | 2.94 | 3.05 |
| 27 14 28.0 | 333 | 6 57 26.38 | 57 22.26 | 22 11 12.0 | 11 18.6 | 8.0042 | 8.213 | 2.93 | 3.03 |
| 28 14 23.8 | 334 | 6 57 11.68 | 57 7.46 | 22 11 35.9 | 11 42.7 | 8.0148 | 8.222 | 2.91 | 3.02 |
| 29 14 19.7 | 335 | 6 56 56.64 | 56 52.32 | 22 12 0.1 | 12 7.0 | 8.0249 | 8.230 | 2.89 | 3.00 |
| 30 14 15.5 | 336 | 6 56 41.24 | 56 36.82 | 22 12 24.8 | 12 31.9 | 8.0345 | 8.238 | 2.88 | 2.98 |
| Dec. 1 14 11.3 | 337 | 6 56 25.48 | 56 20.96 | 22 12 50.1 | 12 57.2 | 8.0437 | 8.246 | 2.86 | 2.97 |
| 2 14 7.1 | 338 | 6 56 9.38 | 56 4.76 | 22 13 15.7 | 13 22.9 | 8.0531 | 8.254 | 2.85 | 2.95 |
| 3 14 2.9 | 339 | 6 55 52.98 | 55 48.28 | 22 13 41.7 | 13 49.1 | 8.0615 | 8.261 | 2.84 | 2.94 |
| 4 13 58.7 | 340 | 6 55 36.29 | 55 31.50 | 22 14 8.1 | 14 15.6 | 8.0694 | 8.267 | 2.82 | 2.93 |
| 5 13 54.5 | 341 | 6 55 19.26 | 55 14.38 | 22 14 34.9 | 14 42.5 | 8.0769 | 8.273 | 2.80 | 2.91 |
| 6 13 50.2 | 342 | 6 55 1.92 | 54 56.96 | 22 15 2.2 | 15 9.9 | 8.0840 | 8.279 | 2.79 | 2.89 |
| 7 13 46.0 | 343 | 6 54 44.28 | 54 39.24 | 22 15 29.8 | 15 37.6 | 8.0918 | 8.284 | 2.77 | 2.87 |
| 8 13 41.8 | 344 | 6 54 26.39 | 54 21.28 | 22 15 57.6 | 16 5.6 | 8.0981 | 8.288 | 2.76 | 2.86 |
| 9 13 37.5 | 345 | 6 54 8.23 | 54 3.05 | 22 16 25.8 | 16 33.9 | 8.1041 | 8.292 | 2.74 | 2.83 |
| 10 13 33.3 | 346 | 6 53 49.81 | 53 44.56 | 22 16 54.1 | 17 2.2 | 8.1098 | 8.296 | 2.73 | 2.80 |
| 11 13 29.1 | 347 | 6 53 31.15 | 53 25.83 | 22 17 22.7 | 17 30.9 | 8.1152 | 8.300 | 2.71 | 2.76 |
| 12 13 24.8 | 348 | 6 53 12.24 | 53 6.87 | 22 17 51.6 | 17 59.8 | 8.1210 | 8.304 | 2.69 | 2.72 |
| 13 13 20.6 | 349 | 6 52 53.09 | 52 47.65 | 22 18 20.7 | 18 29.0 | 8.1260 | 8.307 | 2.68 | 2.68 |
| 14 13 16.3 | 350 | 6 52 33.74 | 52 28.24 | 22 18 50.0 | 18 58.4 | 8.1307 | 8.310 | 2.66 | 2.63 |
| 15 13 12.1 | 351 | 6 52 14.18 | 52 8.62 | 22 19 19.6 | 19 28.1 | 8.1351 | 8.313 | 2.64 | 2.58 |
| 16 13 7.8 | 352 | 6 51 54.44 | 51 48.82 | 22 19 49.5 | 19 58.0 | 8.1392 | 8.316 | 2.62 | 2.52 |
| 17 13 3.5 | 353 | 6 51 34.50 | 51 28.82 | 22 20 19.5 | 20 28.0 | 8.1436 | 8.319 | 2.60 | 2.45 |
| 18 12 59.3 | 354 | 6 51 14.38 | 51 8.66 | 22 20 49.6 | 20 58.1 | 8.1472 | 8.321 | 2.58 | +2.38 |
| 19 12 55.0 | 355 | 6 50 54.10 | 50 48.34 | 22 21 19.8 | 21 28.3 | 8.1505 | 8.322 | 2.55 | |
| 20 12 50.7 | 356 | 6 50 33.67 | 50 27.86 | 22 21 50.1 | 21 58.6 | 8.1535 | 8.324 | 2.51 | |
| 21 12 46.5 | 357 | 6 50 13.08 | 50 7.23 | 22 22 20.4 | 22 29.0 | 8.1563 | 8.325 | 2.47 | |
| 22 12 42.2 | 358 | 6 49 52.37 | 49 46.48 | 22 22 50.8 | 22 59.5 | 8.1593 | 8.326 | 2.43 | |
| 23 12 37.9 | 359 | 6 49 31.56 | 49 25.64 | 22 23 21.3 | 23 30.0 | 8.1615 | 8.326 | 2.38 | |
| 24 12 33.6 | 360 | 6 49 10.65 | 49 4.70 | 22 23 51.8 | 24 0.5 | 8.1635 | 8.326 | 2.33 | |
| 25 12 29.3 | 361 | 6 48 49.63 | 48 43.66 | 22 24 22.3 | 24 31.0 | 8.1653 | 8.326 | 2.28 | |
| 26 12 25.1 | 362 | 6 48 28.52 | 48 22.52 | 22 24 52.7 | 25 1.4 | 8.1669 | 8.325 | 2.22 | |
| 27 12 20.8 | 363 | 6 48 7.35 | 48 1.32 | 22 25 23.1 | 25 31.8 | 8.1683 | 8.325 | 2.15 | |
| 28 12 16.5 | 364 | 6 47 46.13 | 47 40.08 | 22 25 53.7 | 26 2.3 | 8.1696 | 8.325 | −2.08 | |
| 29 12 12.2 | 365 | 6 47 24.86 | 47 18.80 | 22 26 24.3 | 26 32.9 | 8.1706 | 8.325 | | |
| 30 12 7.9 | 366 | 6 47 3.56 | 46 57.51 | 22 26 54.9 | 27 3.5 | 8.1714 | 8.324 | | |
| 31 12 3.6 | 367 | 6 46 42.26 | 46 36.21 | 22 27 25.5 | 27 34.2 | 8.1721 | 8.324 | | |
| 32 11 59.3 | 368 | 6 46 20.96 | 46 14.90 | +22 27 56.1 | 28 5.0 | −8.1728 | + 8.323 | | |

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Jan. 0 8 19.1 | 0 | 2 58 50.98 | 58 50.37 | +16 38 34.8 | 38 32.4 | −7.5344 | − 8.140 | +2.65 | +3.15 |
| 1 8 15.2 | 1 | 2 58 46.13 | 58 45.54 | 16 38 15.5 | 38 13.3 | 7.5180 | 8.117 | 2.66 | 3.16 |
| 2 8 11.2 | 2 | 2 58 41.47 | 58 40.91 | 16 37 57.1 | 37 55.0 | 7.5000 | 8.095 | 2.66 | 3.18 |
| 3 8 7.2 | 3 | 2 58 37.01 | 58 36.48 | 16 37 39.6 | 37 37.6 | 7.4799 | 8.073 | 2.66 | 3.19 |
| 4 8 3.2 | 4 | 2 58 32.75 | 58 32.24 | 16 37 23.0 | 37 21.1 | 7.4605 | 8.050 | 2.66 | 3.20 |
| 5 7 59.2 | 5 | 2 58 28.68 | 58 28.19 | 16 37 7.3 | 37 5.5 | 7.4403 | 8.027 | 2.66 | 3.22 |
| 6 7 55.3 | 6 | 2 58 24.80 | 58 24.33 | 16 36 52.5 | 36 50.8 | 7.4190 | 8.004 | 2.66 | 3.23 |
| 7 7 51.3 | 7 | 2 58 21.11 | 58 20.66 | 16 36 38.4 | 36 36.8 | 7.3967 | 7.978 | 2.66 | 3.24 |
| 8 7 47.3 | 8 | 2 58 17.61 | 58 17.19 | 16 36 25.1 | 36 23.6 | 7.3732 | 7.951 | 2.67 | 3.25 |
| 9 7 43.3 | 9 | 2 58 14.30 | 58 13.91 | 16 36 12.6 | 36 11.2 | 7.3483 | 7.923 | 2.68 | 3.26 |
| 10 7 39.3 | 10 | 2 58 11.18 | 58 10.82 | 16 36 0.9 | 35 59.6 | 7.3204 | 7.893 | 2.68 | 3.27 |
| 11 7 35.3 | 11 | 2 58 8.26 | 58 7.92 | 16 35 50.0 | 35 48.8 | 7.2902 | 7.859 | 2.69 | 3.28 |
| 12 7 31.3 | 12 | 2 58 5.54 | 58 5.28 | 16 35 40.0 | 35 38.9 | 7.2570 | 7.822 | 2.70 | 3.29 |
| 13 7 27.4 | 13 | 2 58 3.04 | 58 2.75 | 16 35 30.8 | 35 29.8 | 7.2206 | 7.780 | 2.70 | 3.30 |
| 14 7 23.4 | 14 | 2 58 0.75 | 58 0.48 | 16 35 22.5 | 35 21.6 | 7.1808 | 7.732 | 2.70 | 3.31 |
| 15 7 19.4 | 15 | 2 57 58.66 | 57 58.42 | 16 35 15.1 | 35 14.3 | 7.1371 | 7.679 | 2.70 | 3.32 |
| 16 7 15.5 | 16 | 2 57 56.78 | 57 56.56 | 16 35 8.6 | 35 7.9 | 7.0908 | 7.618 | 2.70 | 3.33 |
| 17 7 11.5 | 17 | 2 57 55.10 | 57 54.91 | 16 35 3.0 | 35 2.4 | 7.0391 | 7.548 | 2.70 | 3.33 |
| 18 7 7.6 | 18 | 2 57 53.62 | 57 53.46 | 16 34 58.3 | 34 57.8 | 6.9771 | 7.463 | 2.70 | 3.33 |
| 19 7 3.6 | 19 | 2 57 52.35 | 57 52.21 | 16 34 54.5 | 34 54.1 | 6.9049 | 7.359 | 2.70 | 3.33 |
| 20 6 59.6 | 20 | 2 57 51.29 | 57 51.17 | 16 34 51.6 | 34 51.3 | 6.8181 | 7.238 | 2.70 | 3.33 |
| 21 6 55.7 | 21 | 2 57 50.44 | 57 50.35 | 16 34 49.5 | 34 49.4 | 6.7096 | 7.044 | 2.70 | 3.33 |
| 22 6 51.8 | 22 | 2 57 49.80 | 57 49.74 | 16 34 48.3 | 34 48.3 | 6.5728 | 6.685 | 2.70 | 3.33 |
| 23 6 47.8 | 23 | 2 57 49.36 | 57 49.33 | 16 34 48.0 | 34 48.1 | 6.3589 | − 6.141 | 2.70 | 3.33 |
| 24 6 43.9 | 24 | 2 57 49.13 | 57 49.12 | 16 34 48.6 | 34 48.8 | −5.9196 | + 6.881 | 2.70 | 3.33 |
| 25 6 39.9 | 25 | 2 57 49.11 | 57 49.12 | 16 34 50.2 | 34 50.5 | +5.7946 | 7.141 | 2.70 | 3.33 |
| 26 6 36.0 | 26 | 2 57 49.30 | 57 49.34 | 16 34 52.7 | 34 53.1 | 6.3175 | 7.302 | 2.70 | 3.33 |
| 27 6 32.1 | 27 | 2 57 49.70 | 57 49.75 | 16 34 56.1 | 34 56.6 | 6.5480 | 7.420 | 2.70 | 3.33 |
| 28 6 28.1 | 28 | 2 57 50.31 | 57 50.40 | 16 35 0.4 | 35 1.0 | 6.6977 | 7.512 | 2.70 | 3.33 |
| 29 6 24.2 | 29 | 2 57 51.13 | 57 51.24 | 16 35 5.6 | 35 6.3 | 6.8042 | 7.588 | 2.70 | 3.33 |
| 30 6 20.3 | 30 | 2 57 52.16 | 57 52.30 | 16 35 11.7 | 35 12.5 | 6.8973 | 7.653 | 2.70 | 3.33 |
| 31 6 16.4 | 31 | 2 57 53.41 | 57 53.57 | 16 35 18.7 | 35 19.7 | 6.9707 | 7.709 | 2.70 | 3.33 |
| Feb. 1 6 12.5 | 32 | 2 57 54.87 | 57 55.06 | 16 35 26.6 | 35 27.7 | 7.0335 | 7.759 | 2.70 | 3.33 |
| 2 6 8.6 | 33 | 2 57 56.54 | 57 56.76 | 16 35 35.3 | 35 36.5 | 7.0884 | 7.804 | 2.70 | 3.33 |
| 3 6 4.7 | 34 | 2 57 58.42 | 57 58.66 | 16 35 44.9 | 35 46.2 | 7.1371 | 7.844 | 2.70 | 3.33 |
| 4 6 0.8 | 35 | 2 58 0.51 | 58 0.78 | 16 35 55.4 | 35 56.8 | 7.1828 | 7.881 | 2.70 | 3.33 |
| 5 5 57.0 | 36 | 2 58 2.82 | 58 3.11 | 16 36 6.8 | 36 8.3 | 7.2224 | 7.913 | 2.70 | 3.33 |
| 6 5 53.1 | 37 | 2 58 5.33 | 58 5.65 | 16 36 19.0 | 36 20.6 | 7.2570 | 7.944 | 2.70 | 3.33 |
| 7 5 49.2 | 38 | 2 58 8.04 | 58 8.39 | 16 36 32.1 | 36 33.8 | 7.2891 | 7.974 | 2.70 | 3.33 |
| 8 5 45.3 | 39 | 2 58 10.95 | 58 11.32 | 16 36 46.1 | 36 47.9 | 7.3190 | 8.001 | 2.70 | 3.33 |
| 9 5 41.4 | 40 | 2 58 14.06 | 58 14.46 | 16 37 0.9 | 37 2.9 | 7.3483 | 8.025 | 2.70 | 3.33 |
| 10 5 37.5 | 41 | 2 58 17.38 | 58 17.81 | 16 37 16.6 | 37 18.7 | 7.3757 | 8.047 | 2.70 | 3.33 |
| 11 5 33.7 | 42 | 2 58 20.91 | 58 21.37 | 16 37 33.1 | 37 35.3 | 7.4015 | 8.070 | 2.69 | 3.32 |
| 12 5 29.8 | 43 | 2 58 24.65 | 58 25.13 | 16 37 50.5 | 37 52.8 | 7.4259 | 8.093 | 2.69 | 3.32 |
| 13 5 26.0 | 44 | 2 58 28.60 | 58 29.10 | 16 38 8.8 | 38 11.2 | 7.4479 | 8.114 | 2.69 | 3.31 |
| 14 5 22.1 | 45 | 2 58 32.75 | 58 33.27 | 16 38 28.0 | 38 30.5 | 7.4688 | 8.132 | 2.68 | 3.31 |
| 15 5 18.2 | 46 | 2 58 37.10 | 58 37.65 | 16 38 48.0 | 38 50.6 | 7.4883 | 8.150 | 2.68 | 3.30 |
| 16 5 14.4 | 47 | 2 58 41.64 | 58 42.23 | 16 39 8.8 | 39 11.5 | 7.5069 | 8.166 | 2.68 | 3.30 |
| 17 5 10.5 | 48 | 2 58 46.38 | 58 46.99 | 16 39 30.4 | 39 33.2 | 7.5252 | 8.182 | 2.67 | 3.29 |
| 18 5 6.7 | 49 | 2 58 51.32 | 58 51.95 | 16 39 52.8 | 39 55.7 | 7.5428 | 8.199 | 2.67 | 3.29 |
| 19 5 2.8 | 50 | 2 58 56.46 | 58 57.11 | 16 40 16.0 | 40 19.0 | 7.5589 | 8.215 | 2.67 | 3.28 |
| 20 4 59.0 | 51 | 2 59 1.79 | 59 2.47 | 16 40 40.1 | 40 43.2 | 7.5747 | 8.229 | 2.66 | 3.28 |
| 21 4 55.2 | 52 | 2 59 7.32 | 59 8.02 | 16 41 5.0 | 41 8.2 | 7.5901 | 8.243 | 2.66 | 3.27 |
| 22 4 51.3 | 53 | 2 59 13.04 | 59 13.76 | 16 41 30.7 | 41 34.0 | 7.6046 | 8.257 | 2.66 | 3.27 |
| 23 4 47.5 | 54 | 2 59 18.95 | 59 19.70 | 16 41 57.2 | 42 0.6 | 7.6188 | 8.270 | 2.65 | 3.26 |
| 24 4 43.6 | 55 | 2 59 25.06 | 59 25.83 | 16 42 24.5 | 42 28.0 | 7.6328 | 8.283 | 2.65 | 3.26 |
| 25 4 39.8 | 56 | 2 59 31.36 | 59 32.15 | 16 42 52.6 | 42 56.2 | 7.6459 | 8.295 | 2.64 | 3.25 |
| 26 4 36.0 | 57 | 2 59 37.84 | 59 38.65 | 16 43 21.5 | 43 25.2 | 7.6580 | 8.306 | 2.64 | 3.25 |
| 27 4 32.1 | 58 | 2 59 44.50 | 59 45.34 | 16 43 51.1 | 43 54.9 | 7.6701 | 8.316 | 2.63 | 3.24 |
| 28 4 28.3 | 59 | 2 59 51.34 | 59 52.21 | 16 44 21.4 | 44 25.3 | 7.6818 | 8.326 | 2.62 | 3.24 |
| 29 4 24.5 | 60 | 2 59 58.37 | 59 59.26 | 16 44 52.4 | 44 56.4 | 7.6929 | 8.336 | 2.62 | 3.23 |
| 30 4 20.7 | 61 | 3 0 5.58 | 0 6.49 | +16 45 24.1 | 45 28.2 | +7.7037 | + 8.346 | +2.61 | +3.23 |

### FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. | h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Mar. 1 | 4 20.7 | 61 | 3 0 5.58 | 0 6.49 | +16 45 24.1 | 45 28.2 | +7.7037 | + 8.346 | +2.61 | +3.23 |
| 2 | 4 16.9 | 62 | 3 0 12.97 | 0 13.90 | 16 45 56.6 | 46 0.7 | 7.7137 | 8.356 | 2.61 | 3.22 |
| 3 | 4 13.1 | 63 | 3 0 20.53 | 0 21.48 | 16 46 29.8 | 46 34.0 | 7.7235 | 8.365 | 2.60 | 3.21 |
| 4 | 4 9.3 | 64 | 3 0 28.26 | 0 29.24 | 16 47 3.7 | 47 8.0 | 7.7333 | 8.374 | 2.59 | 3.21 |
| 5 | 4 5.5 | 65 | 3 0 36.17 | 0 37.17 | 16 47 38.3 | 47 42.7 | 7.7429 | 8.384 | 2.59 | 3.20 |
| 6 | 4 1.7 | 66 | 3 0 44.25 | 0 45.27 | 16 48 13.7 | 48 18.2 | 7.7521 | 8.393 | 2.58 | 3.19 |
| 7 | 3 57.9 | 67 | 3 0 52.50 | 0 53.54 | 16 48 49.7 | 48 54.3 | 7.7610 | 8.401 | 2.58 | 3.18 |
| 8 | 3 54.1 | 68 | 3 1 0.91 | 1 1.97 | 16 49 26.4 | 49 31.0 | 7.7696 | 8.408 | 2.57 | 3.17 |
| 9 | 3 50.3 | 69 | 3 1 9.48 | 1 10.57 | 16 50 3.7 | 50 8.4 | 7.7779 | 8.415 | 2.57 | 3.17 |
| 10 | 3 46.5 | 70 | 3 1 18.22 | 1 19.33 | 16 50 41.6 | 50 46.4 | 7.7859 | 8.422 | 2.56 | 3.16 |
| 11 | 3 42.7 | 71 | 3 1 27.12 | 1 28.25 | 16 51 20.1 | 51 25.0 | 7.7934 | 8.430 | 2.56 | 3.15 |
| 12 | 3 38.9 | 72 | 3 1 36.17 | 1 37.32 | 16 51 59.3 | 52 4.2 | 7.8009 | 8.437 | 2.55 | 3.14 |
| 13 | 3 35.2 | 73 | 3 1 45.38 | 1 46.55 | 16 52 39.1 | 52 44.1 | 7.8084 | 8.443 | 2.55 | 3.13 |
| 14 | 3 31.4 | 74 | 3 1 54.75 | 1 55.94 | 16 53 19.5 | 53 24.6 | 7.8157 | 8.450 | 2.54 | 3.13 |
| 15 | 3 27.6 | 75 | 3 2 4.27 | 2 5.48 | 11 54 0.5 | 54 5.7 | 7.8227 | 8.456 | 2.54 | 3.12 |
| 16 | 3 23.9 | 76 | 3 2 13.95 | 2 15.18 | 16 54 42.1 | 54 47.4 | 7.8294 | 8.462 | 2.53 | 3.12 |
| 17 | 3 20.1 | 77 | 3 2 23.77 | 2 25.02 | 16 55 24.3 | 55 29.6 | 7.8356 | 8.467 | 2.53 | 3.11 |
| 18 | 3 16.4 | 78 | 3 2 33.73 | 2 35.00 | 16 56 7.0 | 56 12.4 | 7.8418 | 8.473 | 2.52 | 3.10 |
| 19 | 3 12.6 | 79 | 3 2 43.83 | 2 45.12 | 16 56 50.2 | 56 55.7 | 7.8478 | 8.478 | 2.51 | 3.10 |
| 20 | 3 8.8 | 80 | 3 2 54.07 | 2 55.38 | 16 57 33.9 | 57 39.5 | 7.8537 | 8.483 | 2.50 | 3.09 |
| 21 | 3 5.0 | 81 | 3 3 4.44 | 3 5.77 | 16 58 18.1 | 58 23.8 | 7.8595 | 8.488 | 2.49 | 3.08 |
| 22 | 3 1.3 | 82 | 3 3 14.96 | 3 16.30 | 16 59 2.9 | 59 8.6 | 7.8653 | 8.493 | 2.48 | 3.07 |
| 23 | 2 57.5 | 83 | 3 3 25.62 | 3 26.98 | 16 59 48.2 | 59 53.9 | 7.8710 | 8.498 | 2.48 | 3.06 |
| 24 | 2 53.8 | 84 | 3 3 36.41 | 3 37.79 | 17 0 34.0 | 0 39.8 | 7.8763 | 8.503 | 2.47 | 3.05 |
| 25 | 2 50.0 | 85 | 3 3 47.34 | 3 48.74 | 17 1 20.3 | 1 26.2 | 7.8814 | 8.508 | 2.47 | 3.04 |
| 26 | 2 46.3 | 86 | 3 3 58.40 | 3 59.82 | 17 2 7.1 | 2 13.0 | 7.8861 | 8.512 | 2.46 | 3.03 |
| 27 | 2 42.6 | 87 | 3 4 9.57 | 4 11.01 | 17 2 54.3 | 3 0.3 | 7.8907 | 8.517 | 2.45 | 3.02 |
| 28 | 2 38.8 | 88 | 3 4 20.86 | 4 22.31 | 17 3 42.0 | 3 48.0 | 7.8953 | 8.520 | 2.44 | 3.01 |
| 29 | 2 35.1 | 89 | 3 4 32.27 | 4 33.73 | 17 4 30.1 | 4 36.2 | 7.8998 | 8.524 | 2.44 | 3.00 |
| 30 | 2 31.3 | 90 | 3 4 43.79 | 4 45.27 | 17 5 18.6 | 5 24.8 | 7.9041 | 8.528 | 2.43 | 2.99 |
| 31 | 2 27.6 | 91 | 3 4 55.43 | 4 56.93 | 17 6 7.5 | 6 13.8 | 7.9082 | 8.531 | 2.42 | 2.98 |
| Apr. 1 | 2 23.9 | 92 | 3 5 7.18 | 5 8.70 | 17 6 56.8 | 7 3.2 | 7.9123 | 8.535 | 2.41 | 2.97 |
| 2 | 2 20.1 | 93 | 3 5 19.04 | 5 20.57 | 17 7 46.5 | 7 52.9 | 7.9165 | 8.538 | 2.40 | 2.96 |
| 3 | 2 16.4 | 94 | 3 5 31.01 | 5 32.56 | 17 8 36.6 | 8 43.0 | 7.9206 | 8.542 | 2.40 | 2.94 |
| 4 | 2 12.6 | 95 | 3 5 43.10 | 5 44.67 | 17 9 27.1 | 9 33.5 | 7.9246 | 8.545 | 2.39 | 2.93 |
| 5 | 2 8.9 | 96 | 3 5 55.30 | 5 56.88 | 17 10 17.9 | 10 24.4 | 7.9282 | 8.547 | 2.38 | 2.92 |
| 6 | 2 5.2 | 97 | 3 6 7.59 | 6 9.18 | 17 11 9.0 | 11 15.6 | 7.9316 | 8.550 | 2.37 | 2.91 |
| 7 | 2 1.4 | 98 | 3 6 19.97 | 6 21.58 | 17 12 0.4 | 12 7.1 | 7.9348 | 8.553 | 2.36 | 2.90 |
| 8 | 1 57.7 | 99 | 3 6 32.45 | 6 34.07 | 17 12 52.2 | 12 58.9 | 7.9380 | 8.555 | 2.35 | 2.88 |
| 9 | 1 54.0 | 100 | 3 6 45.02 | 6 46.66 | 17 13 44.3 | 13 51.0 | 7.9411 | 8.558 | 2.34 | 2.87 |
| 10 | 1 50.3 | 101 | 3 6 57.68 | 6 59.33 | 17 14 36.7 | 14 43.5 | 7.9442 | 8.561 | 2.33 | 2.86 |
| 11 | 1 46.6 | 102 | 3 7 10.42 | 7 12.08 | 17 15 29.4 | 15 36.3 | 7.9469 | 8.563 | 2.31 | 2.84 |
| 12 | 1 42.8 | 103 | 3 7 23.24 | 7 24.92 | 17 16 22.3 | 16 29.3 | 7.9496 | 8.564 | 2.29 | 2.82 |
| 13 | 1 39.1 | 104 | 3 7 36.14 | 7 37.83 | 17 17 15.4 | 17 22.4 | 7.9523 | 8.566 | 3.27 | 2.81 |
| 14 | 1 35.4 | 105 | 3 7 49.12 | 7 50.82 | 17 18 8.7 | 18 15.7 | 7.9549 | 8.568 | 2.25 | 2.79 |
| 15 | 1 31.7 | 106 | 3 8 2.17 | 8 3.88 | 17 19 2.2 | 19 9.2 | 7.9573 | 8.569 | 2.23 | 2.77 |
| 16 | 1 28.0 | 107 | 3 8 15.30 | 8 17.02 | 17 19 56.0 | 20 3.0 | 7.9597 | 8.572 | 2.20 | 2.75 |
| 17 | 1 24.2 | 108 | 3 8 28.50 | 8 30.23 | 17 20 50.0 | 20 57.1 | 7.9620 | 8.573 | 2.17 | 2.73 |
| 18 | 1 20.5 | 109 | 3 8 41.77 | 8 43.51 | 17 21 44.2 | 21 51.4 | 7.9643 | 8.575 | 2.14 | 2.72 |
| 19 | 1 16.8 | 110 | 3 8 55.11 | 8 56.86 | 17 22 38.6 | 22 45.8 | 7.9665 | 8.576 | 2.11 | 2.70 |
| 20 | 1 13.1 | 111 | 3 9 8.52 | 9 10.28 | 17 23 33.1 | 23 40.3 | 7.9685 | 8.576 | 2.08 | 2.68 |
| 21 | 1 9.4 | 112 | 3 9 21.98 | 9 23.75 | 17 24 27.7 | 24 35.0 | 7.9701 | 8.578 | 2.06 | +2.66 |
| 22 | 1 5.7 | 113 | 3 9 35.49 | 9 37.27 | 17 25 22.5 | 25 29.8 | 7.9717 | 8.580 | 2.04 | |
| 23 | 1 2.0 | 114 | 3 9 49.05 | 9 50.84 | 17 26 17.5 | 26 24.8 | 7.9733 | 8.580 | 2.02 | |
| 24 | 0 58.3 | 115 | 3 10 2.65 | 10 4.45 | 17 27 12.6 | 27 19.9 | 7.9749 | 8.582 | +2.00 | |
| 25 | 0 54.6 | 116 | 3 10 16.30 | 10 18.11 | 17 28 7.9 | 28 15.2 | 7.9765 | 8.584 | | |
| 26 | 0 50.9 | 117 | 3 10 30.00 | 10 31.82 | 17 29 3.3 | 29 10.6 | 7.9779 | 8.584 | | |
| 27 | 0 47.2 | 118 | 3 10 43.75 | 10 45.57 | 17 29 58.7 | 30 6.1 | 7.9791 | 8.584 | | |
| 28 | 0 43.5 | 119 | 3 10 57.53 | 10 59.36 | 17 30 54.2 | 31 1.6 | 7.9803 | 8.585 | | |
| 29 | 0 39.8 | 120 | 3 11 11.35 | 11 13.19 | 17 31 49.8 | 31 57.2 | 7.9815 | 8.586 | | |
| 30 | 0 36.1 | 121 | 3 11 25.21 | 11 27.05 | 17 32 45.5 | 32 52.9 | 7.9825 | 8.586 | | |
| 31 | 0 32.4 | 122 | 3 11 39.10 | 11 40.95 | +17 33 41.2 | 33 48.6 | +7.9835 | + 8.586 | | |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| May 1 0 32.4 | 122 | 3 11 39.10 | 11 40.95 | +17 33 41.2 | 33 48.6 | +7.9835 | + 8.586 | | |
| 2 0 28.7 | 123 | 3 11 53.02 | 11 54.87 | 17 34 36.9 | 34 44.4 | 7.9844 | 8.587 | | |
| 3 0 25.0 | 124 | 3 12 6.96 | 12 8.82 | 17 35 32.7 | 35 40.2 | 7.9853 | 8.587 | | |
| 4 0 21.3 | 125 | 3 12 20.93 | 12 22.80 | 17 36 28.5 | 36 36.0 | 7.9862 | 8.587 | | |
| 5 0 17.6 | 126 | 3 12 34.93 | 12 36.80 | 17 37 24.3 | 37 31.8 | 7.9868 | 8.587 | | |
| 6 0 13.9 | 127 | 3 12 48.95 | 12 50.82 | 17 38 20.1 | 38 27.6 | 7.9872 | 8.587 | | |
| 7 0 10.2 | 128 | 3 13 2.98 | 13 4.86 | 17 39 15.9 | 39 23.4 | 7.9875 | 8.586 | | |
| 8 0 6.5 | 129 | 3 13 17.02 | 13 18.91 | 17 40 11.6 | 40 19.1 | 7.9878 | 8.586 | | |
| 9 0 2.8 | 130 | 3 13 31.07 | 13 32.96 | 17 41 7.3 | 41 14.8 | 7.9881 | 8.585 | | |
| 9 23 59.1 | 131 | 3 13 45.13 | 13 47.02 | 17 42 2.9 | 42 10.4 | 7.9884 | 8.585 | | |
| 10 23 55.4 | 132 | 3 13 59.20 | 14 1.09 | 17 42 58.5 | 43 6.0 | 7.9887 | 8.585 | | |
| 11 23 51.7 | 133 | 3 14 13.27 | 14 15.17 | 17 43 54.0 | 44 1.5 | 7.9887 | 8.584 | | |
| 12 23 48.0 | 134 | 3 14 27.34 | 14 29.24 | 17 44 49.4 | 44 56.9 | 7.9885 | 8.583 | | |
| 13 23 44.3 | 135 | 3 14 41.40 | 14 43.30 | 17 45 44.6 | 45 52.1 | 7.9884 | 8.582 | | |
| 14 23 40.6 | 136 | 3 14 55.46 | 14 57.36 | 17 46 39.7 | 46 47.2 | 7.9881 | 8.581 | | |
| 15 23 36.9 | 137 | 3 15 9.51 | 15 11.41 | 17 47 34.7 | 47 42.2 | 7.9878 | 8.580 | | |
| 16 23 33.2 | 138 | 3 15 23.55 | 15 25.45 | 17 48 29.6 | 48 37.0 | 7.9875 | 8.579 | | |
| 17 23 29.5 | 139 | 3 15 37.57 | 15 39.47 | 17 49 24.3 | 49 31.7 | 7.9872 | 8.578 | | |
| 18 23 25.8 | 140 | 3 15 51.58 | 15 53.48 | 17 50 18.9 | 50 26.3 | 7.9868 | 8.577 | | −2.66 |
| 19 23 22.1 | 141 | 3 16 5.58 | 16 7.48 | 17 51 13.4 | 51 20.8 | 7.9862 | 8.576 | | 2.68 |
| 20 23 18.4 | 142 | 3 16 19.56 | 16 21.46 | 17 52 7.7 | 52 15.1 | 7.9853 | 8.574 | | 2.69 |
| 21 23 14.7 | 143 | 3 16 33.51 | 16 35.41 | 17 53 1.8 | 53 9.1 | 7.9844 | 8.572 | | 2.70 |
| 22 23 11.0 | 144 | 3 16 47.43 | 16 49.33 | 17 53 55.7 | 54 3.0 | 7.9834 | 8.571 | | 2.72 |
| 23 23 7.3 | 145 | 3 17 1.32 | 17 3.22 | 17 54 49.4 | 54 56.7 | 7.9825 | 8.569 | | 2.73 |
| 24 23 3.6 | 146 | 3 17 15.18 | 17 17.08 | 17 55 42.9 | 55 50.2 | 7.9816 | 8.568 | | 2.74 |
| 25 22 59.9 | 147 | 3 17 29.01 | 17 30.90 | 17 56 36.2 | 56 43.5 | 7.9806 | 8.566 | −2.00 | 2.75 |
| 26 22 56.2 | 148 | 3 17 42.80 | 17 44.68 | 17 57 29.3 | 57 36.6 | 7.9793 | 8.564 | 2.02 | 2.76 |
| 27 22 52.5 | 149 | 3 17 56.55 | 17 58.43 | 17 58 22.2 | 58 29.4 | 7.9781 | 8.562 | 2.04 | 2.78 |
| 28 22 48.8 | 150 | 3 18 10.26 | 18 12.14 | 17 59 14.8 | 59 22.0 | 7.9768 | 8.560 | 2.06 | 2.79 |
| 29 22 45.1 | 151 | 3 18 23.93 | 18 25.80 | 18 0 7.2 | 0 14.4 | 7.9752 | 8.558 | 2.08 | 2.80 |
| 30 22 41.4 | 152 | 3 18 37.55 | 18 39.42 | 18 0 59.3 | 1 6.5 | 7.9736 | 8.555 | 2.09 | 2.81 |
| 31 22 37.7 | 153 | 3 18 51.11 | 18 52.98 | 18 1 51.1 | 1 58.2 | 7.9717 | 8.553 | 2.11 | 2.82 |
| June 1 22 34.0 | 154 | 3 19 4.61 | 19 6.48 | 18 2 42.6 | 2 49.7 | 7.9698 | 8.550 | 2.12 | 2.83 |
| 2 22 30.3 | 155 | 3 19 18.05 | 19 19.91 | 18 3 33.8 | 3 40.9 | 7.9678 | 8.548 | 2.14 | 2.84 |
| 3 22 26.5 | 156 | 3 19 31.43 | 19 33.28 | 18 4 24.6 | 4 31.7 | 7.9659 | 8.545 | 2.15 | 2.85 |
| 4 22 22.8 | 157 | 3 19 44.75 | 19 46.59 | 18 5 15.1 | 5 22.1 | 7.9639 | 8.542 | 2.17 | 2.86 |
| 5 22 19.1 | 158 | 3 19 58.01 | 19 59.85 | 18 6 5.3 | 6 12.3 | 7.9620 | 8.541 | 2.18 | 2.87 |
| 6 22 15.4 | 159 | 3 20 11.23 | 20 13.05 | 18 6 55.3 | 7 2.2 | 7.9600 | 8.538 | 2.20 | 2.88 |
| 7 22 11.7 | 160 | 3 20 24.37 | 20 26.19 | 18 7 45.0 | 7 51.9 | 7.9577 | 8.536 | 2.21 | 2.89 |
| 8 22 8.0 | 161 | 3 20 37.44 | 20 39.25 | 18 8 34.4 | 8 41.3 | 7.9553 | 8.532 | 2.23 | 2.90 |
| 9 22 4.3 | 162 | 3 20 50.43 | 20 52.23 | 18 9 23.4 | 9 30.3 | 7.9527 | 8.528 | 2.25 | 2.91 |
| 10 22 0.5 | 163 | 3 21 3.34 | 21 5.13 | 18 10 12.0 | 10 18.8 | 7.9498 | 8.524 | 2.27 | 2.92 |
| 11 21 56.8 | 164 | 3 21 16.16 | 21 17.95 | 18 11 0.1 | 11 6.9 | 7.9469 | 8.521 | 2.29 | 2.92 |
| 12 21 53.1 | 165 | 3 21 28.90 | 21 30.68 | 18 11 47.9 | 11 54.6 | 7.9442 | 8.518 | 2.31 | 2.93 |
| 13 21 49.4 | 166 | 3 21 41.56 | 21 43.33 | 18 12 35.3 | 12 42.0 | 7.9415 | 8.515 | 2.33 | 2.94 |
| 14 21 45.7 | 167 | 3 21 54.14 | 21 55.90 | 18 13 22.4 | 13 29.0 | 7.9384 | 8.511 | 2.34 | 2.95 |
| 15 21 41.9 | 168 | 3 22 6.63 | 22 8.38 | 18 14 9.1 | 14 15.6 | 7.9352 | 8.507 | 2.35 | 2.96 |
| 16 21 38.2 | 169 | 3 22 19.03 | 22 20.76 | 18 14 55.3 | 15 1.8 | 7.9320 | 8.503 | 2.36 | 2.96 |
| 17 21 34.5 | 170 | 3 22 31.33 | 22 33.05 | 18 15 41.1 | 15 47.5 | 7.9285 | 8.499 | 2.37 | 2.97 |
| 18 21 30.8 | 171 | 3 22 43.54 | 22 45.24 | 18 16 26.5 | 16 32.8 | 7.9250 | 8.494 | 2.38 | 2.98 |
| 19 21 27.0 | 172 | 3 22 55.64 | 22 57.33 | 18 17 11.4 | 17 17.7 | 7.9214 | 8.490 | 2.39 | 2.99 |
| 20 21 23.3 | 173 | 3 23 7.64 | 23 9.32 | 18 17 55.9 | 18 2.1 | 7.9178 | 8.485 | 2.40 | 3.00 |
| 21 21 19.5 | 174 | 3 23 19.54 | 23 21.21 | 18 18 39.9 | 18 46.1 | 7.9141 | 8.482 | 2.40 | 3.01 |
| 22 21 15.8 | 175 | 3 23 31.34 | 23 33.00 | 18 19 23.5 | 19 29.6 | 7.9104 | 8.478 | 2.41 | 3.02 |
| 23 21 12.1 | 176 | 3 23 43.04 | 23 44.68 | 18 20 6.7 | 20 12.7 | 7.9064 | 8.473 | 2.42 | 3.03 |
| 24 21 8.3 | 177 | 3 23 54.63 | 23 56.25 | 18 20 49.4 | 20 55.4 | 7.9022 | 8.467 | 2.43 | 3.04 |
| 25 21 4.6 | 178 | 3 24 6.10 | 24 7.71 | 18 21 31.6 | 21 37.6 | 7.8977 | 8.462 | 2.44 | 3.05 |
| 26 21 0.8 | 179 | 3 24 17.45 | 24 19.04 | 18 22 13.3 | 22 19.2 | 7.8931 | 8.457 | 2.44 | 3.06 |
| 27 20 57.1 | 180 | 3 24 28.67 | 24 30.25 | 18 22 54.5 | 23 0.3 | 7.8881 | 8.452 | 2.45 | 3.07 |
| 28 20 53.3 | 181 | 3 24 39.77 | 24 41.33 | 18 23 35.2 | 23 40.9 | 7.8830 | 8.446 | 2.46 | 3.08 |
| 29 20 49.6 | 182 | 3 24 50.74 | 24 52.29 | 18 24 15.4 | 24 21.0 | 7.8782 | 8.441 | 2.47 | 3.09 |
| 30 20 45.8 | 183 | 3 25 1.59 | 25 3.13 | +18 24 55.1 | 25 0.7 | +7.8734 | + 8.436 | −2.47 | −3.10 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| July 1 20 42.1 | 184 | 3 25 12.32 | 25 13.84 | +18 25 34.3 | 25 39.8 | +7.8686 | + 8.430 | −2.48 | −3.10 |
| 2 20 38.3 | 185 | 3 25 22.93 | 25 24.43 | 18 26 12.9 | 26 18.4 | 7.8634 | 8.424 | 2.48 | 3.11 |
| 3 20 34.5 | 186 | 3 25 33.41 | 25 34.89 | 18 26 51.0 | 26 56.4 | 7.8578 | 8.418 | 2.49 | 3.12 |
| 4 20 30.8 | 187 | 3 25 43.75 | 25 45.21 | 18 27 28.5 | 27 33.9 | 7.8520 | 8.412 | 2.50 | 3.12 |
| 5 20 27.0 | 188 | 3 25 53.95 | 25 55.39 | 18 28 5.5 | 28 10.8 | 7.8461 | 8.406 | 2.51 | 3.13 |
| 6 20 23.3 | 189 | 3 26 4.01 | 26 5.43 | 18 28 42.0 | 28 47.2 | 7.8400 | 8.400 | 2.51 | 3.13 |
| 7 20 19.5 | 190 | 3 26 13.93 | 26 15.34 | 18 29 18.0 | 29 23.1 | 7.8338 | 8.393 | 2.52 | 3.14 |
| 8 20 15.7 | 191 | 3 26 23.71 | 26 25.10 | 18 29 53.4 | 29 58.4 | 7.8272 | 8.385 | 2.53 | 3.15 |
| 9 20 11.9 | 192 | 3 26 33.34 | 26 34.71 | 18 30 28.2 | 30 33.2 | 7.8204 | 8.379 | 2.54 | 3.16 |
| 10 20 8.2 | 193 | 3 26 42.82 | 26 44.17 | 18 31 2.5 | 31 7.4 | 7.8135 | 8.372 | 2.55 | 3.16 |
| 11 20 4.4 | 194 | 3 26 52.15 | 26 53.48 | 18 31 36.2 | 31 41.0 | 7.8065 | 8.364 | 2.55 | 3.17 |
| 12 20 0.6 | 195 | 3 27 1.33 | 27 2.64 | 18 32 9.3 | 32 14.0 | 7.7994 | 8.356 | 2.56 | 3.17 |
| 13 19 56.8 | 196 | 3 27 10.35 | 27 11.64 | 18 32 41.8 | 32 46.4 | 7.7919 | 8.348 | 2.57 | 3.18 |
| 14 19 53.0 | 197 | 3 27 19.21 | 27 20.48 | 18 33 13.7 | 33 18.2 | 7.7844 | 8.340 | 2.58 | 3.18 |
| 15 19 49.3 | 198 | 3 27 27.92 | 27 29.16 | 18 33 45.0 | 33 49.5 | 7.7769 | 8.331 | 2.59 | 3.18 |
| 16 19 45.5 | 199 | 3 27 36.48 | 27 37.70 | 18 34 15.7 | 34 20.1 | 7.7693 | 8.323 | 2.59 | 3.19 |
| 17 19 41.7 | 200 | 3 27 44.89 | 27 46.09 | 18 34 45.8 | 34 50.1 | 7.7610 | 8.314 | 2.60 | 3.19 |
| 18 19 37.9 | 201 | 3 27 53.14 | 27 54.31 | 18 35 15.3 | 35 19.5 | 7.7521 | 8.304 | 2.61 | 3.20 |
| 19 19 34.1 | 202 | 3 28 1.22 | 28 2.36 | 18 35 44.1 | 35 48.3 | 7.7429 | 8.295 | 2.62 | 3.20 |
| 20 19 30.3 | 203 | 3 28 9.12 | 28 10.24 | 18 36 12.3 | 36 16.4 | 7.7336 | 8.286 | 2.62 | 3.20 |
| 21 19 26.5 | 204 | 3 28 16.85 | 28 17.95 | 18 36 39.9 | 36 43.9 | 7.7237 | 8.276 | 2.63 | 3.21 |
| 22 19 22.7 | 205 | 3 28 24.40 | 28 25.48 | 18 37 6.9 | 37 10.8 | 7.7137 | 8.265 | 2.63 | 3.21 |
| 23 19 18.8 | 206 | 3 28 31.78 | 28 32.84 | 18 37 33.2 | 37 37.0 | 7.7037 | 8.255 | 2.64 | 3.22 |
| 24 19 15.0 | 207 | 3 28 39.00 | 28 40.03 | 18 37 58.9 | 38 2.6 | 7.6936 | 8.243 | 2.64 | 3.22 |
| 25 19 11.2 | 208 | 3 28 46.05 | 28 47.05 | 18 38 23.9 | 38 27.5 | 7.6830 | 8.233 | 2.65 | 3.22 |
| 26 19 7.4 | 209 | 3 28 52.92 | 28 53.90 | 18 38 48.3 | 38 51.8 | 7.6723 | 8.220 | 2.65 | 3.22 |
| 27 19 3.6 | 210 | 3 28 59.62 | 29 0.58 | 18 39 12.0 | 39 15.4 | 7.6608 | 8.207 | 2.66 | 3.23 |
| 28 18 59.8 | 211 | 3 29 6.15 | 29 7.08 | 18 39 35.0 | 39 38.3 | 7.6486 | 8.194 | 2.66 | 3.23 |
| 29 18 56.0 | 212 | 3 29 12.49 | 29 13.40 | 18 39 57.3 | 40 0.5 | 7.6359 | 8.180 | 2.66 | 3.23 |
| 30 18 52.1 | 213 | 3 29 18.64 | 29 19.52 | 18 40 18.9 | 40 22.0 | 7.6224 | 8.166 | 2.66 | 3.23 |
| 31 18 48.3 | 214 | 3 29 24.60 | 29 25.45 | 18 40 39.8 | 40 42.8 | 7.6083 | 8.152 | 2.66 | 3.23 |
| Aug. 1 18 44.4 | 215 | 3 29 30.37 | 29 31.19 | 18 41 0.0 | 41 2.9 | 7.5940 | 8.137 | 2.66 | 3.23 |
| 2 18 40.6 | 216 | 3 29 35.96 | 29 36.75 | 18 41 19.5 | 41 22.3 | 7.5798 | 8.121 | 2.66 | 3.23 |
| 3 18 36.8 | 217 | 3 29 41.36 | 29 42.13 | 18 41 38.3 | 41 41.0 | 7.5655 | 8.105 | 2.66 | 3.23 |
| 4 18 32.9 | 218 | 3 29 46.58 | 29 47.33 | 18 41 56.4 | 41 59.0 | 7.5505 | 8.088 | 2.67 | 3.23 |
| 5 18 29.1 | 219 | 3 29 51.62 | 29 52.34 | 18 42 13.8 | 42 16.3 | 7.5348 | 8.073 | 2.67 | 3.23 |
| 6 18 25.3 | 220 | 3 29 56.47 | 29 57.16 | 18 42 30.6 | 42 33.0 | 7.5189 | 8.055 | 2.67 | 3.23 |
| 7 18 21.4 | 221 | 3 30 1.14 | 30 1.80 | 18 42 46.7 | 42 49.0 | 7.5003 | 8.036 | 2.68 | 3.23 |
| 8 18 17.5 | 222 | 3 30 5.61 | 30 6.25 | 18 43 2.1 | 43 4.3 | 7.4809 | 8.016 | 2.68 | 3.23 |
| 9 18 13.7 | 223 | 3 30 9.88 | 30 10.49 | 18 43 16.7 | 43 18.8 | 7.4595 | 7.995 | 2.68 | 3.23 |
| 10 18 9.8 | 224 | 3 30 13.94 | 30 14.52 | 18 43 30.6 | 43 32.6 | 7.4381 | 7.974 | 2.68 | 3.23 |
| 11 18 6.0 | 225 | 3 30 17.80 | 30 18.35 | 18 43 43.8 | 43 45.7 | 7.4156 | 7.951 | 2.68 | 3.23 |
| 12 18 2.1 | 226 | 3 30 21.46 | 30 21.98 | 18 43 56.3 | 43 58.1 | 7.3931 | 7.926 | 2.68 | 3.23 |
| 13 17 58.2 | 227 | 3 30 24.93 | 30 25.42 | 18 44 8.1 | 44 9.8 | 7.3680 | 7.901 | 2.69 | 3.23 |
| 14 17 54.4 | 228 | 3 30 28.20 | 30 28.66 | 18 44 19.2 | 44 20.8 | 7.3401 | 7.873 | 2.69 | 3.23 |
| 15 17 50.5 | 229 | 3 30 31.26 | 30 31.69 | 18 44 29.6 | 44 31.1 | 7.3117 | 7.844 | 2.69 | 3.23 |
| 16 17 46.6 | 230 | 3 30 34.12 | 30 34.52 | 18 44 39.3 | 44 40.7 | 7.2797 | 7.813 | 2.69 | 3.23 |
| 17 17 42.7 | 231 | 3 30 36.77 | 30 37.14 | 18 44 48.3 | 44 49.6 | 7.2452 | 7.777 | 2.70 | 3.23 |
| 18 17 38.8 | 232 | 3 30 39.21 | 30 39.55 | 18 44 56.6 | 44 57.7 | 7.2086 | 7.738 | 2.70 | 3.23 |
| 19 17 34.9 | 233 | 3 30 41.45 | 30 41.76 | 18 45 4.1 | 45 5.1 | 7.1688 | 7.697 | 2.70 | 3.23 |
| 20 17 31.0 | 234 | 3 30 43.48 | 30 43.76 | 18 45 10.9 | 45 11.8 | 7.1260 | 7.653 | 2.70 | 3.23 |
| 21 17 27.1 | 235 | 3 30 45.31 | 30 45.56 | 18 45 17.0 | 45 17.8 | 7.0784 | 7.603 | 2.70 | 3.23 |
| 22 17 23.1 | 236 | 3 30 46.94 | 30 47.16 | 18 45 22.4 | 45 23.1 | 7.0222 | 7.548 | 2.70 | 3.23 |
| 23 17 19.2 | 237 | 3 30 48.36 | 30 48.55 | 18 45 27.1 | 45 27.7 | 6.9610 | 7.484 | 2.70 | 3.23 |
| 24 17 15.3 | 238 | 3 30 49.58 | 30 49.74 | 18 45 31.1 | 45 31.6 | 6.8896 | 7.408 | 2.70 | 3.23 |
| 25 17 11.4 | 239 | 3 30 50.60 | 30 50.73 | 18 45 34.4 | 45 34.8 | 6.7994 | 7.317 | 2.70 | 3.23 |
| 26 17 7.5 | 240 | 3 30 51.41 | 30 51.51 | 18 45 37.0 | 45 37.3 | 6.6917 | 7.202 | 2.70 | 3.23 |
| 27 17 3.6 | 241 | 3 30 52.02 | 30 52.09 | 18 45 38.9 | 45 39.1 | 6.5394 | 7.016 | 2.70 | 3.23 |
| 28 16 59.6 | 242 | 3 30 52.42 | 30 52.46 | 18 45 40.0 | 45 40.1 | 6.3028 | 6.743 | 2.70 | 3.23 |
| 29 16 55.7 | 243 | 3 30 52.61 | 30 52.62 | 18 45 40.4 | 45 40.4 | +5.7435 | + 5.840 | 2.70 | 3.23 |
| 30 16 51.7 | 244 | 3 30 52.59 | 30 52.57 | 18 45 40.0 | 45 39.9 | −5.9196 | − 6.685 | 2.70 | 3.23 |
| 31 16 47.8 | 245 | 3 30 52.37 | 30 52.32 | +18 45 38.9 | 45 38.7 | −6.3589 | − 6.986 | −2.70 | −3.23 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. |  | Apparent Declination. |  | Log. Coefficient of $t$ in Sidereal Minutes. |  | Log. Coefficient of $t^2$. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. |  | h. m. s. | m. s. | ° ′ ″ | ′ ″ |  |  |  |  |
| Sept. 1 16 43.9 | 246 | 3 30 51.94 | 30 51.86 | +18 45 37.1 | 45 36.8 | −6.5728 | − 7.162 | −2.70 | −3.23 |
| 2 16 39.9 | 247 | 3 30 51.30 | 30 51.19 | 18 45 34.6 | 45 34.2 | 6.7096 | 7.287 | 2.69 | 3.23 |
| 3 16 36.0 | 248 | 3 30 50.46 | 30 50.32 | 18 45 31.4 | 45 30.9 | 6.8135 | 7.384 | 2.69 | 3.23 |
| 4 16 32.0 | 249 | 3 30 49.42 | 30 49.25 | 18 45 27.5 | 45 26.9 | 6.9011 | 7.463 | 2.69 | 3.23 |
| 5 16 28.1 | 250 | 3 30 48.17 | 30 47.97 | 18 45 22.9 | 45 22.2 | 6.9707 | 7.530 | 2.69 | 3.23 |
| 6 16 24.1 | 251 | 3 30 46.72 | 30 46.49 | 18 45 17.6 | 45 16.8 | 7.0307 | 7.596 | 2.68 | 3.23 |
| 7 16 20.1 | 252 | 3 30 45.07 | 30 44.81 | 18 45 11.5 | 45 10.6 | 7.0834 | 7.646 | 2.68 | 3.23 |
| 8 16 16.2 | 253 | 3 30 43.22 | 30 42.93 | 18 45 4.7 | 45 3.7 | 7.1327 | 7.693 | 2.68 | 3.23 |
| 9 16 12.2 | 254 | 3 30 41.16 | 30 40.84 | 18 44 57.2 | 44 56.1 | 7.1749 | 7.738 | 2.68 | 3.23 |
| 10 16 8.3 | 255 | 3 30 38.90 | 30 38.55 | 18 44 48.9 | 44 47.7 | 7.2133 | 7.775 | 2.68 | 3.23 |
| 11 16 4.3 | 256 | 3 30 36.44 | 30 36.06 | 18 44 39.9 | 44 38.6 | 7.2486 | 7.807 | 2.68 | 3.23 |
| 12 16 0.3 | 257 | 3 30 33.78 | 30 33.38 | 18 44 30.2 | 44 28.8 | 7.2797 | 7.836 | 2.67 | 3.22 |
| 13 15 56.4 | 258 | 3 30 30.93 | 30 30.50 | 18 44 19.9 | 44 18.4 | 7.3087 | 7.865 | 2.67 | 3.22 |
| 14 15 52.4 | 259 | 3 30 27.89 | 30 27.43 | 18 44 8.9 | 44 7.3 | 7.3359 | 7.893 | 2.67 | 3.21 |
| 15 15 48.4 | 260 | 3 30 24.66 | 30 24.17 | 18 43 57.2 | 43 55.5 | 7.3628 | 7.919 | 2.66 | 3.21 |
| 16 15 44.4 | 261 | 3 30 21.23 | 30 20.71 | 18 43 44.8 | 43 43.0 | 7.3879 | 7.944 | 2.66 | 3.20 |
| 17 15 40.4 | 262 | 3 30 17.61 | 30 17.06 | 18 43 31.7 | 43 29.8 | 7.4109 | 7.967 | 2.66 | 3.20 |
| 18 15 36.4 | 263 | 3 30 13.79 | 30 13.22 | 18 43 17.9 | 43 15.9 | 7.4326 | 7.990 | 2.65 | 3.19 |
| 19 15 32.4 | 264 | 3 30 9.78 | 30 9.18 | 18 43 3.4 | 43 1.3 | 7.4532 | 8.010 | 2.65 | 3.19 |
| 20 15 28.4 | 265 | 3 30 5.58 | 30 4.95 | 18 42 48.3 | 42 46.1 | 7.4729 | 8.030 | 2.65 | 3.18 |
| 21 15 24.4 | 266 | 3 30 1.19 | 30 0.53 | 18 42 32.5 | 42 30.2 | 7.4917 | 8.047 | 2.64 | 3.18 |
| 22 15 20.4 | 267 | 3 29 56.61 | 29 55.93 | 18 42 16.1 | 42 13.7 | 7.5096 | 8.064 | 2.64 | 3.18 |
| 23 15 16.4 | 268 | 3 29 51.84 | 29 51.14 | 18 41 59.0 | 41 56.5 | 7.5261 | 8.081 | 2.63 | 3.17 |
| 24 15 12.4 | 269 | 3 29 46.90 | 29 46.17 | 18 41 41.3 | 41 38.7 | 7.5420 | 8.098 | 2.62 | 3.17 |
| 25 15 8.4 | 270 | 3 29 41.78 | 29 41.02 | 18 41 22.9 | 41 20.2 | 7.5572 | 8.114 | 2.62 | 3.16 |
| 26 15 4.4 | 271 | 3 29 36.48 | 29 35.69 | 18 41 3.9 | 41 1.1 | 7.5720 | 8.128 | 2 61 | 3.15 |
| 27 15 0.4 | 272 | 3 29 31.00 | 29 30.19 | 18 40 44.2 | 40 41.3 | 7.5855 | 8.141 | 2.61 | 3.14 |
| 28 14 56.3 | 273 | 3 29 25.35 | 29 24.52 | 18 40 23.9 | 40 20.9 | 7.5986 | 8.154 | 2.60 | 3.13 |
| 29 14 52,3 | 274 | 3 29 19.53 | 29 18.67 | 18 40 3.0 | 39 59.9 | 7.6116 | 8.166 | 2.59 | 3.13 |
| 30 14 48.3 | 275 | 3 29 13.53 | 29 12.65 | 18 39 41.5 | 39 38.3 | 7.6243 | 8.179 | 2.59 | 3.12 |
| Oct. 1 14 44.2 | 276 | 3 29 7.36 | 29 6.46 | 18 39 19.4 | 39 16.1 | 7.6363 | 8.190 | 2.58 | 3.12 |
| 2 14 40.2 | 277 | 3 29 1.03 | 29 0.11 | 18 38 56.7 | 38 53.3 | 7.6473 | 8.200 | 2.57 | 3.11 |
| 3 14 36.1 | 278 | 3 28 54.54 | 28 53.60 | 18 38 33.4 | 38 30.0 | 7.6573 | 8.210 | 2.56 | 3.10 |
| 4 14 32.1 | 279 | 3 28 47.90 | 28 46.93 | 18 38 9.6 | 38 6.1 | 7.6671 | 8.221 | 2.56 | 3.10 |
| 5 14 28.1 | 280 | 3 28 41.11 | 28 40.12 | 18 37 45.2 | 37 41.6 | 7.6769 | 8.232 | 2.55 | 3.09 |
| 6 14 24.0 | 281 | 3 28 34.17 | 28 33.16 | 18 37 20.2 | 37 16.5 | 7.6867 | 8.243 | 2.54 | 3.08 |
| 7 14 20.0 | 282 | 3 28 27.07 | 28 26.04 | 18 36 54.6 | 36 50.9 | 7.6959 | 8.252 | 2.53 | 3.07 |
| 8 14 15.9 | 283 | 3 28 19.82 | 28 18.76 | 18 36 28.5 | 36 24.7 | 7.7049 | 8.260 | 2.52 | 3.06 |
| 9 14 11.9 | 284 | 3 28 12.42 | 28 11.34 | 18 36 1.9 | 35 58.0 | 7.7137 | 8.268 | 2.51 | 3.05 |
| 10 14 7.8 | 285 | 3 28 4.87 | 28 3.77 | 18 35 34.8 | 35 30.8 | 7.7224 | 8.276 | 2.50 | 3.04 |
| 11 14 3.7 | 286 | 3 27 57.17 | 27 56.05 | 18 35 7.2 | 35 3.1 | 7.7308 | 8.284 | 2.49 | 3.03 |
| 12 13 59.7 | 287 | 3 27 49.33 | 27 48.20 | 18 34 39.1 | 34 35.0 | 7.7380 | 8.292 | 2.48 | 3.02 |
| 13 13 55.6 | 288 | 3 27 41.37 | 27 40.22 | 18 34 10.6 | 34 6.4 | 7.7445 | 8.299 | 2.48 | 3.01 |
| 14 13 51.6 | 289 | 3 27 33.30 | 27 32.13 | 18 33 41.6 | 33 37.3 | 7.7509 | 8.307 | 2.47 | 3.00 |
| 15 13 47.5 | 290 | 3 27 25.11 | 27 23.92 | 18 33 12.1 | 33 7.8 | 7.7573 | 8.314 | 2.47 | 2.99 |
| 16 13 43.4 | 291 | 3 27 16.80 | 27 15.59 | 18 32 42.1 | 32 37.8 | 7.7636 | 8.320 | 2.46 | 2.98 |
| 17 13 39.3 | 292 | 3 27 8.36 | 27 7.14 | 18 32 11.7 | 32 7.3 | 7.7698 | 8.327 | 2.44 | 2.97 |
| 18 13 35.3 | 293 | 3 26 59.80 | 26 58.57 | 18 31 40.8 | 31 36.3 | 7.7759 | 8.333 | 2.43 | 2.96 |
| 19 13 31.2 | 294 | 3 26 51.12 | 26 49.87 | 18 31 9.5 | 31 4.9 | 7.7819 | 8.338 | 2.41 | 2.94 |
| 20 13 27.1 | 295 | 3 26 42.33 | 26 41.06 | 18 30 37.8 | 30 33.2 | 7.7869 | 8.344 | 2.40 | 2.93 |
| 21 13 23.0 | 296 | 3 26 33.44 | 26 32.16 | 18 30 5.7 | 30 1.1 | 7.7917 | 8.348 | 2.38 | 2.92 |
| 22 13 18.9 | 297 | 3 26 24.46 | 26 23.17 | 18 29 33.3 | 29 28.6 | 7.7965 | 8.353 | 2.35 | 2.91 |
| 23 13 14.9 | 298 | 3 26 15.38 | 26 14.08 | 18 29 0.5 | 28 55.7 | 7.8009 | 8.359 | 2.32 | 2.90 |
| 24 13 10.8 | 299 | 3 26 6.20 | 26 4.89 | 18 28 27.3 | 28 22.5 | 7.8054 | 8.364 | 2.29 | 2.88 |
| 25 13 6.7 | 300 | 3 25 56.93 | 25 55.60 | 18 27 53.7 | 27 49.0 | 7.8098 | 8.368 | 2.26 | 2.87 |
| 26 13 2.6 | 301 | 3 25 47.56 | 25 46.22 | 18 27 19.8 | 27 15.1 | 7.8140 | 8.372 | 2.23 | 2.86 |
| 27 12 58.5 | 302 | 3 25 38.11 | 25 36.76 | 18 26 45.6 | 26 40.8 | 7.8177 | 8.375 | 2.20 | 2.84 |
| 28 12 54.4 | 303 | 3 25 28.59 | 25 27.23 | 18 26 11.1 | 26 6.2 | 7.8209 | 8.380 | 2.17 | 2.82 |
| 29 12 50.3 | 304 | 3 25 19.00 | 25 17.63 | 18 25 36.3 | 25 31.4 | 7.8236 | 8.383 | 2.14 | 2.81 |
| 30 12 46.3 | 305 | 3 25 9.35 | 25 7.97 | 18 25 1.3 | 24 56.3 | 7.8267 | 8.387 | 2.11 | 2.79 |
| 31 12 42.2 | 306 | 3 24 59.63 | 24 58.24 | 18 24 26.0 | 24 21.0 | 7.8298 | 8.390 | 2.08 | 2.77 |
| 32 12 38.1 | 307 | 3 24 49.84 | 24 48.45 | +18 23 50.4 | 23 45.4 | −7.8324 | − 8.393 | −2.05 | −2.75 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Nov. 1 12 38.1 | 307 | 3 24 49.84 | 24 48.45 | +18 23 50.4 | 23 45.4 | −7.8324 | − 8.393 | −2.05 | −2.75 |
| 2 12 34.0 | 308 | 3 24 40.00 | 24 38.60 | 18 23 14.6 | 23 9.5 | 7.8347 | 8.395 | 2.02 | 2.73 |
| 3 12 29.9 | 309 | 3 24 30.10 | 24 28.69 | 18 22 38.6 | 22 33.5 | 7.8369 | 8.396 | −2.00 | 2.72 |
| 4 12 25.8 | 310 | 3 24 20.15 | 24 18.74 | 18 22 2.5 | 21 57.4 | 7.8391 | 8.399 | | 2.70 |
| 5 12 21.7 | 311 | 3 24 10.16 | 24 8.75 | 18 21 26.2 | 21 21.1 | 7.8408 | 8.400 | | 2.68 |
| 6 12 17.6 | 312 | 3 24 0.13 | 23 58.72 | 18 20 49.8 | 20 44.7 | 7.8421 | 8.402 | | −2.66 |
| 7 12 13.5 | 313 | 3 23 50.07 | 23 48.65 | 18 20 13.2 | 20 8.0 | 7.8434 | 8.405 | | |
| 8 12 9.4 | 314 | 3 23 39.98 | 23 38.55 | 18 19 36.4 | 19 31.2 | 7.8447 | 8.407 | | |
| 9 12 5.3 | 315 | 3 23 29.86 | 23 28.43 | 18 18 59.4 | 18 54.2 | 7.8459 | 8.409 | | |
| 10 12 1.2 | 316 | 3 23 19.72 | 23 18.29 | 18 18 22.3 | 18 17.1 | 7.8468 | 8.409 | | |
| 11 11 57.1 | 317 | 3 23 9.56 | 23 8.13 | 18 17 45.2 | 17 40.0 | 7.8472 | 8.411 | | |
| 12 11 53.0 | 318 | 3 22 59.39 | 22 57.96 | 18 17 8.0 | 17 2.8 | 7.8476 | 8.411 | | |
| 13 11 48.9 | 319 | 3 22 49.21 | 22 47.78 | 18 16 30.8 | 16 25.6 | 7.8481 | 8.411 | | |
| 14 11 44.8 | 320 | 3 22 39.02 | 22 37.60 | 18 15 53.6 | 15 48.4 | 7.8486 | 8.412 | | |
| 15 11 40.7 | 321 | 3 22 28.84 | 22 27.42 | 18 15 16.3 | 15 11.1 | 7.8482 | 8.412 | | |
| 16 11 36.6 | 322 | 3 22 18.67 | 22 17.25 | 18 14 39.0 | 14 33.8 | 7.8476 | 8.412 | | |
| 17 11 32.5 | 323 | 3 22 8.51 | 22 7.09 | 18 14 1.7 | 13 56.5 | 7.8472 | 8.411 | | |
| 18 11 28.4 | 324 | 3 21 58.36 | 21 56.94 | 18 13 24.5 | 13 19.3 | 7.8468 | 8.411 | | |
| 19 11 24.3 | 325 | 3 21 48.22 | 21 46.80 | 18 12 47.3 | 12 42.1 | 7.8459 | 8.411 | | |
| 20 11 20.2 | 326 | 3 21 38.10 | 21 36.68 | 18 12 10.1 | 12 4.9 | 7.8447 | 8.409 | | |
| 21 11 16.1 | 327 | 3 21 28.01 | 21 26.60 | 18 11 33.0 | 11 27.8 | 7.8433 | 8.408 | +2.00 | |
| 22 11 12.0 | 328 | 3 21 17.96 | 21 16.56 | 18 10 56.0 | 10 50.9 | 7.8417 | 8.407 | 2.04 | |
| 23 11 7.9 | 329 | 3 21 7.95 | 21 6.56 | 18 10 19.2 | 10 14.1 | 7.8400 | 8.406 | 2.08 | |
| 24 11 3.8 | 330 | 3 20 57.98 | 20 56.59 | 18 9 42.5 | 9 37.4 | 7.8383 | 8.405 | 2.11 | +2.66 |
| 25 10 59.7 | 331 | 3 20 48.04 | 20 46.66 | 18 9 5.9 | 9 0.8 | 7.8365 | 8.402 | 2.15 | 2.68 |
| 26 10 55.6 | 332 | 3 20 38.15 | 20 36.78 | 18 8 29.5 | 8 24.4 | 7.8343 | 8.400 | 2.18 | 2.70 |
| 27 10 51.5 | 333 | 3 20 28.32 | 20 26.96 | 18 7 53.3 | 7 48.3 | 7.8316 | 8.398 | 2.20 | 2.72 |
| 28 10 47.4 | 334 | 3 20 18.55 | 20 17.20 | 18 7 17.3 | 7 12.3 | 7.8287 | 8.395 | 2.23 | 2.74 |
| 29 10 43.3 | 335 | 3 20 8.85 | 20 7.51 | 18 6 41.5 | 6 36.5 | 7.8258 | 8.391 | 2.25 | 2.76 |
| 30 10 39.2 | 336 | 3 19 59.21 | 19 57.88 | 18 6 6.0 | 6 1.0 | 7.8229 | 8.388 | 2.28 | 2.78 |
| Dec. 1 10 35.1 | 337 | 3 19 49.63 | 19 48.32 | 18 5 30.8 | 5 25.8 | 7.8199 | 8.385 | 2.30 | 2.80 |
| 2 10 31.0 | 338 | 3 19 40.13 | 19 38.83 | 18 4 55.8 | 4 50.9 | 7.8163 | 8.382 | 2.32 | 2.82 |
| 3 10 26.9 | 339 | 3 19 30.71 | 19 29.42 | 18 4 21.0 | 4 16.2 | 7.8126 | 8.379 | 2.34 | 2.84 |
| 4 10 22.8 | 340 | 3 19 21.37 | 19 20.09 | 18 3 46.5 | 3 41.7 | 7.8089 | 8.377 | 2.36 | 2.86 |
| 5 10 18.7 | 341 | 3 19 12.11 | 19 10.84 | 18 3 12.2 | 3 7.5 | 7.8046 | 8.374 | 2.38 | 2.88 |
| 6 10 14.6 | 342 | 3 19 2.94 | 19 1.69 | 18 2 38.3 | 2 33.7 | 7.7999 | 8.368 | 2.39 | 2.90 |
| 7 10 10.6 | 343 | 3 18 53.88 | 18 52.64 | 18 2 4.8 | 2 0.3 | 7.7946 | 8.362 | 2.40 | 2.92 |
| 8 10 6.5 | 344 | 3 18 44.93 | 18 43.70 | 18 1 31.7 | 1 27.2 | 7.7893 | 8.357 | 2.40 | 2.94 |
| 9 10 2.4 | 345 | 3 18 36.09 | 18 34.88 | 18 0 59.0 | 0 54.6 | 7.7839 | 8.351 | 2.41 | 2.96 |
| 10 9 58.4 | 346 | 3 18 27.36 | 18 26.17 | 18 0 26.8 | 0 22.4 | 7.7786 | 8.345 | 2.42 | 2.98 |
| 11 9 54.3 | 347 | 3 18 18.73 | 18 17.56 | 17 59 55.0 | 59 50.6 | 7.7733 | 8.341 | 2.44 | 3.00 |
| 12 9 50.3 | 348 | 3 18 10.21 | 18 9.05 | 17 59 23.5 | 59 19.2 | 7.7679 | 8.336 | 2.45 | 3.02 |
| 13 9 46.2 | 349 | 3 18 1.81 | 18 0.66 | 17 58 52.4 | 58 48.2 | 7.7621 | 8.329 | 2.47 | 3.04 |
| 14 9 42.1 | 350 | 3 17 53.52 | 17 52.39 | 17 58 21.8 | 58 17.6 | 7.7558 | 8.323 | 2.48 | 3.06 |
| 15 9 38.0 | 351 | 3 17 45.35 | 17 44.24 | 17 57 51.6 | 57 47.5 | 7.7489 | 8.314 | 2.49 | 3.08 |
| 16 9 34.0 | 352 | 3 17 37.32 | 17 36.23 | 17 57 22.0 | 57 17.9 | 7.7413 | 8.307 | 2.50 | 3.09 |
| 17 9 29.9 | 353 | 3 17 29.43 | 17 28.36 | 17 56 52.9 | 56 48.9 | 7.7336 | 8.299 | 2.52 | 3.10 |
| 18 9 25.9 | 354 | 3 17 21.68 | 17 20.63 | 17 56 24.3 | 56 20.4 | 7.7258 | 8.292 | 2.53 | 3.11 |
| 19 9 21.8 | 355 | 3 17 14.07 | 17 13.04 | 17 55 56.2 | 55 52.4 | 7.7178 | 8.285 | 2.55 | 3.11 |
| 20 9 17.7 | 356 | 3 17 6.60 | 17 5.59 | 17 55 28.6 | 55 24.9 | 7.7096 | 8.278 | 2.56 | 3.12 |
| 21 9 13.7 | 357 | 3 16 59.27 | 16 58.28 | 17 55 1.5 | 54 57.9 | 7.7007 | 8.268 | 2.56 | 3.12 |
| 22 9 9.6 | 358 | 3 16 52.09 | 16 51.13 | 17 54 35.0 | 54 31.5 | 7.6917 | 8.257 | 2.57 | 3.13 |
| 23 9 5.6 | 359 | 3 16 45.07 | 16 44.13 | 17 54 9.2 | 54 5.7 | 7.6824 | 8.247 | 2.57 | 3.13 |
| 24 9 1.5 | 360 | 3 16 38.20 | 16 37.28 | 17 53 44.0 | 53 40.6 | 7.6723 | 8.236 | 2.58 | 3.14 |
| 25 8 57.5 | 361 | 3 16 31.49 | 16 30.59 | 17 53 19.4 | 53 16.1 | 7.6615 | 8.224 | 2.58 | 3.15 |
| 26 8 53.4 | 362 | 3 16 24.95 | 16 24.07 | 17 52 55.5 | 52 52.2 | 7.6506 | 8.213 | 2.59 | 3.16 |
| 27 8 49.4 | 363 | 3 16 18.57 | 16 17.72 | 17 52 32.2 | 52 29.0 | 7.6397 | 8.202 | 2.59 | 3.17 |
| 28 8 45.3 | 364 | 3 16 12.35 | 16 11.52 | 17 52 9.5 | 52 6.4 | 7.6282 | 8.190 | 2.60 | 3.17 |
| 29 8 41.3 | 365 | 3 16 6.30 | 16 5.49 | 17 51 47.4 | 51 44.4 | 7.6164 | 8.178 | 2.60 | 3.18 |
| 30 8 37.3 | 366 | 3 16 0.41 | 15 59.62 | 17 51 25.9 | 51 23.0 | 7.6046 | 8.166 | 2.61 | 3.19 |
| 31 8 33.3 | 367 | 3 15 54.68 | 15 53.91 | +17 51 5.0 | 51 2.2 | −7.5924 | − 8.154 | +2.61 | +3.20 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Jan. 0 4 30.2 | 0 | 23 9 12.58 | 9 12.43 | – 6 36 23.6 | 36 24.6 | +7.4713 | + 8.293 | +2.44 | +3.22 |
| 1 4 26.3 | 1 | 23 9 16.90 | 9 16.75 | 6 35 55.0 | 35 56.0 | 7.4829 | 8.303 | 2.43 | 3.21 |
| 2 4 22.5 | 2 | 23 9 21.30 | 9 21.15 | 6 35 24.9 | 35 26.0 | 7.4940 | 8.314 | 2.43 | 3.21 |
| 3 4 18.6 | 3 | 23 9 25.85 | 9 25.69 | 6 34 54.8 | 34 55.9 | 7.5042 | 8.325 | 2.43 | 3.21 |
| 4 4 14.7 | 4 | 23 9 30.50 | 9 30.34 | 6 34 24.0 | 34 25.2 | 7.5145 | 8.335 | 2.42 | 3.20 |
| 5 4 10.9 | 5 | 23 9 35.27 | 9 35.10 | 6 33 52.6 | 33 53.8 | 7.5244 | 8.344 | 2.42 | 3.20 |
| 6 4 7.0 | 6 | 23 9 40.14 | 9 39.97 | 6 33 20.5 | 33 21.7 | 7.5341 | 8.353 | 2.41 | 3.19 |
| 7 4 3.2 | 7 | 23 9 45.12 | 9 44.95 | 6 32 47.7 | 32 48.9 | 7.5435 | 8.362 | 2.41 | 3.19 |
| 8 3 59.3 | 8 | 23 9 50.20 | 9 50.03 | 6 32 14.3 | 32 15.5 | 7.5527 | 8.370 | 2.40 | 3.18 |
| 9 3 55.5 | 9 | 23 9 55.39 | 9 55.22 | 6 31 40.3 | 31 41.5 | 7.5615 | 8.378 | 2.40 | 3.18 |
| 10 3 51.7 | 10 | 23 10 0.69 | 10 0.51 | 6 31 5.6 | 31 6.8 | 7.5700 | 8.386 | 2.39 | 3.17 |
| 11 3 47.8 | 11 | 23 10 6.09 | 10 5.90 | 6 30 30.3 | 30 31.6 | 7.5780 | 8.393 | 2.39 | 3.17 |
| 12 3 44.0 | 12 | 23 10 11.59 | 10 11.39 | 6 29 54.4 | 29 55.7 | 7.5858 | 8.400 | 2.38 | 3.16 |
| 13 3 40.1 | 13 | 23 10 17.18 | 10 16.98 | 6 29 17.9 | 29 19.2 | 7.5938 | 8.407 | 2.37 | 3.16 |
| 14 3 36.3 | 14 | 23 10 22.87 | 10 22.67 | 6 28 40.8 | 28 42.1 | 7.6006 | 8.414 | 2.36 | 3.15 |
| 15 3 32.4 | 15 | 23 10 28.65 | 10 28.45 | 6 28 3.1 | 28 4.4 | 7.6076 | 8.421 | 2.36 | 3.14 |
| 16 3 28.6 | 16 | 23 10 34.53 | 10 34.33 | 6 27 24.8 | 27 26.2 | 7.6144 | 8.427 | 2.35 | 3.13 |
| 17 3 24.8 | 17 | 23 10 40.50 | 10 40.30 | 6 26 46.0 | 26 47.4 | 7.6208 | 8.433 | 2.34 | 3.12 |
| 18 3 21.0 | 18 | 23 10 46.56 | 10 46.35 | 6 26 6.7 | 26 8.1 | 7.6272 | 8.439 | 2.33 | 3.11 |
| 19 3 17.1 | 19 | 23 10 52.71 | 10 52.49 | 6 25 26.8 | 25 28.3 | 7.6335 | 8.445 | 2.33 | 3.11 |
| 20 3 13.3 | 20 | 23 10 58.94 | 10 58.72 | 6 24 46.4 | 24 47.9 | 7.6396 | 8.450 | 2.32 | 3.10 |
| 21 3 9.5 | 21 | 23 11 5.26 | 11 5.04 | 6 24 5.5 | 24 7.0 | 7.6457 | 8.456 | 2.31 | 3.09 |
| 22 3 5.6 | 22 | 23 11 11.67 | 11 11.45 | 6 23 24.1 | 23 25.5 | 7.6515 | 8.461 | 2.30 | 3.09 |
| 23 3 1.8 | 23 | 23 11 18.16 | 11 17.95 | 6 22 42.1 | 22 43.5 | 7.6569 | 8.466 | 2.30 | 3.08 |
| 24 2 58.0 | 24 | 23 11 24.74 | 11 24.52 | 6 21 59.7 | 22 1.1 | 7.6622 | 8.471 | 2.29 | 3.07 |
| 25 2 54.2 | 25 | 23 11 31.40 | 11 31.17 | 6 21 16.8 | 21 18.2 | 7.6672 | 8.476 | 2.28 | 3.06 |
| 26 2 50.4 | 26 | 23 11 38.13 | 11 37.90 | 6 20 33.4 | 20 34.8 | 7.6721 | 8.481 | 2.27 | 3.05 |
| 27 2 46.5 | 27 | 23 11 44.94 | 11 44.71 | 6 19 49.5 | 19 50.9 | 7.6769 | 8.486 | 2.27 | 3.04 |
| 28 2 42.7 | 28 | 23 11 51.82 | 11 51.59 | 6 19 5.2 | 19 6.6 | 7.6817 | 8.490 | 2.26 | 3.03 |
| 29 2 38.9 | 29 | 23 11 58.78 | 11 58.55 | 6 18 20.5 | 18 21.9 | 7.6864 | 8.495 | 2.25 | 3.02 |
| 30 2 35.1 | 30 | 23 12 5.81 | 12 5.58 | 6 17 35.3 | 17 36.7 | 7.6909 | 8.499 | 2.24 | 3.01 |
| 31 2 31.3 | 31 | 23 12 12.91 | 12 12.68 | 6 16 49.7 | 16 51.2 | 7.6952 | 8.503 | 2.23 | 3.00 |
| Feb. 1 2 27.5 | 32 | 23 12 20.08 | 12 19.85 | 6 16 3.7 | 16 5.2 | 7.6993 | 8.507 | 2.22 | 2.99 |
| 2 2 23.7 | 33 | 23 12 27.32 | 12 27.09 | 6 15 17.3 | 15 18.8 | 7.7033 | 8.511 | 2.21 | 2.98 |
| 3 2 19.9 | 34 | 23 12 34.63 | 12 34.39 | 6 14 30.5 | 14 32.0 | 7.7072 | 8.514 | 2.19 | 2.96 |
| 4 2 16.1 | 35 | 23 12 42.00 | 12 41.75 | 6 13 43.3 | 13 44.8 | 7.7108 | 8.517 | 2.18 | 2.95 |
| 5 2 12.3 | 36 | 23 12 49.43 | 12 49.18 | 6 12 55.8 | 12 57.3 | 7.7143 | 8.520 | 2.17 | 2.94 |
| 6 2 8.5 | 37 | 23 12 56.92 | 12 56.67 | 6 12 7.9 | 12 9.4 | 7.7177 | 8.523 | 2.16 | 2.92 |
| 7 2 4.7 | 38 | 23 13 4.47 | 13 4.22 | 6 11 19.6 | 11 21.1 | 7.7210 | 8.526 | 2.14 | 2.90 |
| 8 2 0.9 | 39 | 23 13 12.08 | 13 11.82 | 6 10 31.0 | 10 32.5 | 7.7243 | 8.529 | 2.13 | 2.88 |
| 9 1 57.1 | 40 | 23 13 19.74 | 13 19.48 | 6 9 42.1 | 9 43.6 | 7.7275 | 8.532 | 2.11 | 2.86 |
| 10 1 53.3 | 41 | 23 13 27.45 | 13 27.19 | 6 8 52.9 | 8 54.4 | 7.7306 | 8.535 | 2.10 | 2.84 |
| 11 1 49.5 | 42 | 23 13 35.21 | 13 34.96 | 6 8 3.4 | 8 5.0 | 7.7334 | 8.537 | 2.08 | 2.82 |
| 12 1 45.7 | 43 | 23 13 43.03 | 13 42.78 | 6 7 13.6 | 7 15.3 | 7.7359 | 8.540 | 2.06 | 2.80 |
| 13 1 41.9 | 44 | 23 13 50.89 | 13 50.64 | 6 6 23.6 | 6 25.3 | 7.7384 | 8.542 | 2.04 | 2.78 |
| 14 1 38.1 | 45 | 23 13 58.80 | 13 58.54 | 6 5 33.3 | 5 35.0 | 7.7407 | 8.544 | 2.02 | 2.76 |
| 15 1 34.3 | 46 | 23 14 6.74 | 14 6.49 | 6 4 42.8 | 4 44.5 | 7.7430 | 8.546 | 2.00 | 2.74 |
| 16 1 30.5 | 47 | 23 14 14.73 | 14 14.48 | 6 3 52.1 | 3 53.8 | 7.7451 | 8.548 | 1.98 | 2.72 |
| 17 1 26.7 | 48 | 23 14 22.76 | 14 22.50 | 6 3 1.1 | 3 2.8 | 7.7472 | 8.550 | 1.96 | 2.70 |
| 18 1 22.9 | 49 | 23 14 30.82 | 14 30.57 | 6 2 9.9 | 2 11.6 | 7.7492 | 8.552 | 1.94 | 2.68 |
| 19 1 19.1 | 50 | 23 14 38.92 | 14 38.67 | 6 1 18.5 | 1 20.2 | 7.7510 | 8.553 | 1.91 | 2.65 |
| 20 1 15.3 | 51 | 23 14 47.06 | 14 46.80 | 6 0 26.9 | 0 28.6 | 7.7527 | 8.555 | 1.89 | 2.62 |
| 21 1 11.5 | 52 | 23 14 55.22 | 14 54.97 | 5 59 35.1 | 59 36.9 | 7.7543 | 8.556 | 1.86 | 2.59 |
| 22 1 7.7 | 53 | 23 15 3.42 | 15 3.17 | 5 58 43.2 | 58 45.0 | 7.7558 | 8.557 | 1.83 | 2.56 |
| 23 1 3.9 | 54 | 23 15 11.64 | 15 11.39 | 5 57 51.2 | 57 52.9 | 7.7573 | 8.558 | 1.80 | 2.53 |
| 24 1 0.1 | 55 | 23 15 19.89 | 15 19.64 | 5 56 59.1 | 57 0.7 | 7.7587 | 8.559 | 1.77 | 2.50 |
| 25 0 56.3 | 56 | 23 15 28.16 | 15 27.91 | 5 56 6.8 | 56 8.4 | 7.7600 | 8.560 | 1.74 | 2.46 |
| 26 0 52.5 | 57 | 23 15 36.46 | 15 36.20 | 5 55 14.3 | 55 15.9 | 7.7612 | 8.561 | 1.71 | 2.42 |
| 27 0 48.7 | 58 | 23 15 44.78 | 15 44.52 | 5 54 21.8 | 54 23.4 | 7.7623 | 8.562 | 1.67 | +2.38 |
| 28 0 44.9 | 59 | 28 15 53.12 | 15 52.86 | 5 53 29.2 | 53 30.7 | 7.7632 | 8.563 | 1.62 | |
| 29 0 41.1 | 60 | 23 16 1.48 | 16 1.21 | 5 52 36.5 | 52 38.0 | 7.7640 | 8.564 | 1.57 | |
| 30 0 37.3 | 61 | 23 16 9.85 | 16 9.58 | – 5 51 43.7 | 51 45.2 | +7.7647 | + 8.565 | +1.51 | |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s | ° ′ ″ | ′ ″ | | | | |
| Mar. 1 0 37.3 | 61 | 23 16 9.85 | 16 9.58 | − 5 51 43.7 | 51 45.2 | +7.7647 | + 8.565 | +1.51 | |
| 2 0 33.5 | 62 | 23 16 18.23 | 16 17.97 | 5 50 50.8 | 50 52.4 | 7.7654 | 8.565 | +1.43 | |
| 3 0 29.7 | 63 | 23 16 26.63 | 16 26.37 | 5 49 57.9 | 49 59.5 | 7.7659 | 8.566 | | |
| 4 0 25.9 | 64 | 23 16 35.03 | 16 34.77 | 5 49 5.0 | 49 6.6 | 7.7663 | 8.566 | | |
| 5 0 22.1 | 65 | 23 16 43.44 | 16 43.19 | 5 48 12.0 | 48 13.6 | 7.7667 | 8.566 | | |
| 6 0 18.4 | 66 | 23 16 51.86 | 16 51.61 | 5 47 19.1 | 47 20.7 | 7.7669 | 8.566 | | |
| 7 0 14.6 | 67 | 23 17 0.29 | 17 0.04 | 5 46 26.1 | 46 27.7 | 7.7670 | 8.566 | | |
| 8 0 10.8 | 68 | 23 17 8.71 | 17 8.47 | 5 45 33.2 | 45 34.8 | 7.7670 | 8.566 | | |
| 9 0 7.0 | 69 | 23 17 17.13 | 17 16.90 | 5 44 40.3 | 44 41.9 | 7.7669 | 8.566 | | |
| 10 0 3.2 | 70 | 23 17 25.55 | 17 25.32 | 5 43 47.5 | 43 49.1 | 7.7668 | 8.565 | | |
| 10 23 59.4 | 71 | 23 17 33.97 | 17 33.73 | 5 42 54.7 | 42 56.3 | 7.7665 | 8.565 | | |
| 11 23 55.6 | 72 | 23 17 42.38 | 17 42.13 | 5 42 2.0 | 42 3.6 | 7.7662 | 8.564 | | |
| 12 23 51.8 | 73 | 23 17 50.78 | 17 50.53 | 5 41 9.4 | 41 11.0 | 7.7657 | 8.563 | | |
| 13 23 48.0 | 74 | 23 17 59.17 | 17 58.92 | 5 40 16.8 | 40 18.5 | 7.7652 | 8.562 | | |
| 14 23 44.2 | 75 | 23 18 7.55 | 18 7.30 | 5 39 24.4 | 39 26.0 | 7.7645 | 8.561 | −1.41 | −2.41 |
| 15 23 40.4 | 76 | 23 18 15.92 | 18 15.67 | 5 38 32.1 | 38 33.6 | 7.7638 | 8.560 | 1.49 | 2.45 |
| 16 23 36.7 | 77 | 23 18 24.27 | 18 24.02 | 5 37 39.9 | 37 41.4 | 7.7629 | 8.559 | 1.56 | 2.49 |
| 17 23 32.9 | 78 | 23 18 32.60 | 18 32.35 | 5 36 47.8 | 36 49.3 | 7.7620 | 8.558 | 1.62 | 2.52 |
| 18 23 29.1 | 79 | 23 18 40.91 | 18 40.67 | 5 35 55.8 | 35 57.4 | 7.7610 | 8.557 | 1.67 | 2.55 |
| 19 23 25.3 | 80 | 23 18 49.20 | 18 48.97 | 5 35 4.0 | 35 5.7 | 7.7598 | 8.556 | 1.71 | 2.58 |
| 20 23 21.5 | 81 | 23 18 57.47 | 18 57.24 | 5 34 12.4 | 34 14.1 | 7.7585 | 8.554 | 1.75 | 2.61 |
| 21 23 17.7 | 82 | 23 19 5.71 | 19 5.48 | 5 33 21.1 | 33 22.7 | 7.7572 | 8.552 | 1.79 | 2.64 |
| 22 23 13.9 | 83 | 23 19 13.93 | 19 13.70 | 5 32 30.0 | 32 31.5 | 7.7558 | 8.550 | 1.82 | 2.67 |
| 23 23 10.1 | 84 | 23 19 22.12 | 19 21.89 | 5 31 39.1 | 31 40.5 | 7.7541 | 8.548 | 1.85 | 2.70 |
| 24 23 6.3 | 85 | 23 19 30.28 | 19 30.05 | 5 30 48.4 | 30 49.7 | 7.7524 | 8.546 | 1.88 | 2.73 |
| 25 23 2.5 | 86 | 23 19 38.41 | 19 38.18 | 5 29 57.9 | 29 59.2 | 7.7507 | 8.544 | 1.90 | 2.75 |
| 26 22 58.7 | 87 | 23 19 46.51 | 19 46.28 | 5 29 7.6 | 29 8.9 | 7.7489 | 8.542 | 1.92 | 2.77 |
| 27 22 54.9 | 88 | 23 19 54.57 | 19 54.34 | 5 28 17.6 | 28 18.9 | 7.7472 | 8.540 | 1.94 | 2.79 |
| 28 22 51.1 | 89 | 23 20 2.60 | 20 2.37 | 5 27 27.8 | 27 29.1 | 7.7454 | 8.538 | 1.96 | 2.81 |
| 29 22 47.3 | 90 | 23 20 10.59 | 20 10.36 | 5 26 38.3 | 26 39.6 | 7.7435 | 8.536 | 1.98 | 2.83 |
| 30 22 43.5 | 91 | 23 20 18.54 | 20 18.32 | 5 25 49.0 | 25 50.3 | 7.7414 | 8.533 | 2.00 | 2.85 |
| 31 22 39.7 | 92 | 23 20 26.46 | 20 26.24 | 5 25 0.0 | 25 1.3 | 7.7390 | 8.530 | 2.03 | 2.87 |
| Apr. 1 22 35.9 | 93 | 23 20 34.33 | 20 34.11 | 5 24 11.4 | 24 12.7 | 7.7364 | 8.527 | 2.05 | 2.89 |
| 2 22 32.1 | 94 | 23 20 42.15 | 20 41.93 | 5 23 23.1 | 23 24.4 | 7.7337 | 8.524 | 2.07 | 2.91 |
| 3 22 28.3 | 95 | 23 20 49.92 | 20 49.71 | 5 22 35.1 | 22 36.4 | 7.7309 | 8.521 | 2.09 | 2.92 |
| 4 22 24.5 | 96 | 23 20 57.64 | 20 57.44 | 5 21 47.5 | 21 48.8 | 7.7279 | 8.518 | 2.10 | 2.94 |
| 5 22 20.7 | 97 | 23 21 5.31 | 21 5.11 | 5 21 0.2 | 21 1.5 | 7.7249 | 8.515 | 2.11 | 2.95 |
| 6 22 16.9 | 98 | 23 21 12.93 | 21 12.73 | 5 20 13.3 | 20 14.5 | 7.7219 | 8.512 | 2.12 | 2.96 |
| 7 22 13.1 | 99 | 23 21 20.49 | 21 20.29 | 5 19 26.7 | 19 27.9 | 7.7188 | 8.508 | 2.13 | 2.97 |
| 8 22 9.3 | 100 | 23 21 27.99 | 21 27.79 | 5 18 40.5 | 18 41.7 | 7.7156 | 8.504 | 2.14 | 2.98 |
| 9 22 5.5 | 101 | 23 21 35.44 | 21 35.24 | 5 17 54.7 | 17 55.9 | 7.7122 | 8.500 | 2.15 | 2.99 |
| 10 22 1.7 | 102 | 23 21 42.83 | 21 42.63 | 5 17 9.3 | 17 10.5 | 7.7087 | 8.496 | 2.16 | 3.00 |
| 11 21 57.9 | 103 | 23 21 50.16 | 21 49.96 | 5 16 24.4 | 16 25.5 | 7.7051 | 8.492 | 2.17 | 3.01 |
| 12 21 54.1 | 104 | 23 21 57.43 | 21 57.23 | 5 15 39.8 | 15 41.0 | 7.7014 | 8.488 | 2.18 | 3.02 |
| 13 21 50.3 | 105 | 23 22 4.63 | 22 4.43 | 5 14 55.7 | 14 56.9 | 7.6975 | 8.484 | 2.19 | 3.03 |
| 14 21 46.5 | 106 | 23 22 11.77 | 22 11.57 | 5 14 12.1 | 14 13.2 | 7.6936 | 8.480 | 2.20 | 3.04 |
| 15 21 42.6 | 107 | 23 22 18.84 | 22 18.65 | 5 13 28.9 | 13 30.0 | 7.6895 | 8.475 | 2.21 | 3.05 |
| 16 21 38.8 | 108 | 23 22 25.84 | 22 25.66 | 5 12 46.2 | 12 47.3 | 7.6854 | 8.470 | 2.22 | 3.06 |
| 17 21 35.0 | 109 | 23 22 32.77 | 22 32.60 | 5 12 4.0 | 12 5.0 | 7.6812 | 8.465 | 2.23 | 3.07 |
| 18 21 31.1 | 110 | 23 22 39.64 | 22 39.47 | 5 11 22.2 | 11 23.2 | 7.6767 | 8.460 | 2.24 | 3.08 |
| 19 21 27.3 | 111 | 23 22 46.44 | 22 46.26 | 5 10 40.9 | 10 41.9 | 7.6721 | 8.455 | 2.24 | 3.08 |
| 20 21 23.5 | 112 | 23 22 53.16 | 22 52.98 | 5 10 0.1 | 10 1.1 | 7.6672 | 8.450 | 2.25 | 3.09 |
| 21 21 19.7 | 113 | 23 22 59.80 | 22 59.63 | 5 9 19.8 | 9 20.7 | 7.6621 | 8.445 | 2.26 | 3.10 |
| 22 21 15.9 | 114 | 23 23 6.37 | 23 6.20 | 5 8 39.9 | 8 40.9 | 7.6568 | 8.440 | 2.27 | 3.11 |
| 23 21 12.0 | 115 | 23 23 12.86 | 23 12.69 | 5 8 0.6 | 8 1.6 | 7.6514 | 8.434 | 2.28 | 3.12 |
| 24 21 8.2 | 116 | 23 23 19.27 | 23 19.11 | 5 7 21.8 | 7 22.8 | 7.6459 | 8.428 | 2.29 | 3.13 |
| 25 21 4.4 | 117 | 23 23 25.60 | 23 25.44 | 5 6 43.5 | 6 44.5 | 7.6403 | 8.422 | 2.30 | 3.13 |
| 26 21 0.6 | 118 | 23 23 31.85 | 23 31.69 | 5 6 5.8 | 6 6.8 | 7.6345 | 8.416 | 2.31 | 3.14 |
| 27 20 56.7 | 119 | 23 23 38.01 | 23 37.86 | 5 5 28.7 | 5 29.7 | 7.6286 | 8.409 | 2.31 | 3.14 |
| 28 20 52.9 | 120 | 23 23 44.09 | 23 43.94 | 5 4 52.2 | 4 53.2 | 7.6225 | 8.402 | 2.32 | 3.15 |
| 29 20 49.1 | 121 | 23 23 50.09 | 23 49.94 | 5 4 16.2 | 4 17.2 | 7.6163 | 8.395 | 2.33 | 3.15 |
| 30 20 45.3 | 122 | 23 23 55.99 | 23 55.85 | − 5 3 40.8 | 3 41.8 | +7.6099 | + 8.388 | −2.34 | −3.16 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| May 1 20 41.4 | 123 | 23 24 1.81 | 24 1.67 | – 5 3 6.0 | 3 6.9 | +7.6032 | + 8.380 | –2.34 | –3.17 |
| 2 20 37.6 | 124 | 23 24 7.54 | 24 7.40 | 5 2 31.8 | 2 32.6 | 7.5963 | 8.372 | 2.35 | 3.17 |
| 3 20 33.8 | 125 | 23 24 13.18 | 24 13.04 | 5 1 58.1 | 1 59.0 | 7.5892 | 8.364 | 2.35 | 3.18 |
| 4 20 29.9 | 126 | 23 24 18.72 | 24 18.59 | 5 1 25.1 | 1 26.0 | 7.5819 | 8.356 | 2.36 | 3.18 |
| 5 20 26.1 | 127 | 23 24 24.17 | 24 24.04 | 5 0 52.8 | 0 53.6 | 7.5743 | 8.348 | 2.36 | 3.19 |
| 6 20 22.2 | 128 | 23 24 29.52 | 24 29.40 | 5 0 21.1 | 0 21.9 | 7.5666 | 8.339 | 2.37 | 3.19 |
| 7 20 18.4 | 129 | 23 24 34.78 | 24 34.66 | 4 59 50.0 | 59 50.8 | 7.5586 | 8.330 | 2.37 | 3.19 |
| 8 20 14.6 | 130 | 23 24 39.94 | 24 39.83 | 4 59 19.6 | 59 20.3 | 7.5504 | 8.321 | 2.38 | 3.20 |
| 9 20 10.7 | 131 | 23 24 45.01 | 24 44.90 | 4 58 49.8 | 58 50.5 | 7.5419 | 8.311 | 2 38 | 3.20 |
| 10 20 6.9 | 132 | 23 24 49.97 | 24 49.87 | 4 58 20.7 | 58 21.4 | 7.5333 | 8.301 | 2.39 | 3.20 |
| 11 20 3.0 | 133 | 23 24 54.84 | 24 54.74 | 4 57 52.2 | 57 52.9 | 7.5244 | 8.291 | 2.39 | 3.21 |
| 12 19 59.2 | 134 | 23 24 59.61 | 24 59.51 | 4 57 24.4 | 57 25.1 | 7.5151 | 8.281 | 2.40 | 3.21 |
| 13 19 55.3 | 135 | 23 25 4.27 | 25 4.17 | 4 56 57.2 | 56 57.9 | 7.5056 | 8.270 | 2.40 | 3.21 |
| 14 19 51.5 | 136 | 23 25 8.83 | 25 8.73 | 4 56 30.7 | 56 31.4 | 7.4957 | 8.259 | 2.40 | 3.21 |
| 15 19 47.7 | 137 | 23 25 13.29 | 25 13.19 | 4 56 4.9 | 56 5.6 | 7.4854 | 8.247 | 2.41 | 3.22 |
| 16 19 43.8 | 138 | 23 25 17.64 | 25 17.54 | 4 55 39.8 | 55 40.5 | 7.4748 | 8.235 | 2.41 | 3.22 |
| 17 19 39.9 | 139 | 23 25 21.88 | 25 21.79 | 4 55 15.4 | 55 16.0 | 7.4639 | 8.223 | 2.41 | 3.22 |
| 18 19 36.1 | 140 | 23 25 26.02 | 25 25.93 | 4 54 51.7 | 54 52.2 | 7.4527 | 8.210 | 2.41 | 3.23 |
| 19 19 32.2 | 141 | 23 25 30.05 | 25 29.96 | 4 54 28.7 | 54 29.2 | 7.4411 | 8.197 | 2.42 | 3.23 |
| 20 19 28.3 | 142 | 23 25 33.97 | 25 33.89 | 4 54 6.3 | 54 6.9 | 7.4291 | 8.183 | 2.42 | 3.23 |
| 21 19 24.5 | 143 | 23 25 37.79 | 25 37.70 | 4 53 44.7 | 53 45.2 | 7.4168 | 8.169 | 2.42 | 3.23 |
| 22 19 20.6 | 144 | 23 25 41.49 | 25 41.41 | 4 53 23.8 | 53 24.2 | 7.4041 | 8.155 | 2.42 | 3.24 |
| 23 19 16.7 | 145 | 23 25 45.09 | 25 45.01 | 4 53 3.6 | 53 4.0 | 7.3911 | 8.140 | 2.43 | 3.24 |
| 24 19 12.8 | 146 | 23 25 48.57 | 25 48.50 | 4 52 44.1 | 52 44.5 | 7.3776 | 8.124 | 2.43 | 3.24 |
| 25 19 8.9 | 147 | 23 25 51.96 | 25 51.88 | 4 52 25.3 | 52 25.7 | 7.3638 | 8.107 | 2.43 | 3.25 |
| 26 19 5.1 | 148 | 23 25 55.23 | 25 55.15 | 4 52 7.3 | 52 7.6 | 7.3481 | 8.089 | 2.43 | 3.25 |
| 27 19 1.2 | 149 | 23 25 58.38 | 25 58.30 | 4 51 50.0 | 51 50.3 | 7.3330 | 8.071 | 2.44 | 3.25 |
| 28 18 57.3 | 150 | 23 26 1.42 | 26 1.34 | 4 51 33.4 | 51 33.7 | 7.3158 | 8.052 | 2.44 | 3.26 |
| 29 18 53.4 | 151 | 23 26 4.34 | 26 4.27 | 4 51 17.6 | 51 17.9 | 7.2980 | 8.031 | 2.44 | 3.26 |
| 30 18 49.5 | 152 | 23 26 7.14 | 26 7.08 | 4 51 2.5 | 51 2.8 | 7.2809 | 8.009 | 2.44 | 3.26 |
| 31 18 45.6 | 153 | 23 26 9.83 | 26 9.77 | 4 50 48.2 | 50 48.5 | 7.2616 | 7.986 | 2.45 | 3.26 |
| June 1 18 41.7 | 154 | 23 26 12.40 | 26 12.35 | 4 50 34.7 | 50 35.0 | 7.2420 | 7.961 | 2.45 | 3.26 |
| 2 18 37.8 | 155 | 23 26 14.86 | 26 14.81 | 4 50 21.9 | 50 22.2 | 7.2219 | 7.935 | 2.45 | 3.27 |
| 3 18 33.9 | 156 | 23 26 17.20 | 26 17.16 | 4 50 9.9 | 50 10.2 | 7.1995 | 7.907 | 2.45 | 3.27 |
| 4 18 30.0 | 157 | 23 26 19.42 | 26 19.39 | 4 49 58.6 | 49 58.9 | 7.1761 | 7.876 | 2.45 | 3.27 |
| 5 18 26.1 | 158 | 23 26 21.52 | 26 21.50 | 4 49 48.1 | 49 48.4 | 7.1524 | 7.843 | 2.46 | 3.27 |
| 6 18 22.2 | 159 | 23 26 23.51 | 26 23.48 | 4 49 38.4 | 49 38.7 | 7.1261 | 7.808 | 2.46 | 3.27 |
| 7 18 18.3 | 160 | 23 26 25.38 | 26 25.34 | 4 49 29.5 | 49 29.7 | 7.0989 | 7.770 | 2.46 | 3.27 |
| 8 18 14.4 | 161 | 23 26 27.12 | 26 27.09 | 4 49 21.3 | 49 21.5 | 7.0695 | 7.729 | 2.46 | 3.27 |
| 9 18 10.5 | 162 | 23 26 28.75 | 26 28.73 | 4 49 13.9 | 49 14.1 | 7.0375 | 7.685 | 2.46 | 3.27 |
| 10 18 6.6 | 163 | 23 26 30.26 | 26 30.24 | 4 49 7.2 | 49 7.4 | 7.0038 | 7.638 | 2.46 | 3.27 |
| 11 18 2.7 | 164 | 23 26 31.65 | 26 31.63 | 4 49 1.3 | 49 1.5 | 6.9655 | 7.582 | 2.46 | 3.27 |
| 12 17 58.8 | 165 | 23 26 32.92 | 26 32.90 | 4 48 56.2 | 48 56.4 | 6.9280 | 7.514 | 2.46 | 3.27 |
| 13 17 54.9 | 166 | 23 26 34.08 | 26 34.05 | 4 48 51.9 | 48 52.0 | 6.8790 | 7.444 | 2.46 | 3.27 |
| 14 17 51.0 | 167 | 23 26 35.11 | 26 35.09 | 4 48 48.3 | 48 48.4 | 6.8284 | 7.347 | 2.46 | 3.27 |
| 15 17 47.1 | 168 | 23 26 36.02 | 26 36.00 | 4 48 45.5 | 48 45.5 | 6.7710 | 7.239 | 2.46 | 3.27 |
| 16 17 43.2 | 169 | 23 26 36.81 | 26 36.80 | 4 48 43.4 | 48 43.4 | 6.7049 | 7.072 | 2.46 | 3.27 |
| 17 17 39.3 | 170 | 23 26 37.48 | 26 37.47 | 4 48 42.1 | 48 42.1 | 6.6340 | 6.842 | 2.46 | 3.27 |
| 18 17 35.3 | 171 | 23 26 38.04 | 26 38.03 | 4 48 41.5 | 48 41.5 | 6.5385 | + 6.194 | 2.46 | 3.27 |
| 19 17 31.4 | 172 | 23 26 38.48 | 26 38.47 | 4 48 41.7 | 48 41.7 | 6.4214 | – 6.620 | 2.46 | 3.26 |
| 20 17 27.5 | 173 | 23 26 38.80 | 26 38.79 | 4 48 42.7 | 48 42.6 | 6.2566 | 6.956 | 2.46 | 3.26 |
| 21 17 23.5 | 174 | 23 26 39.00 | 26 38.99 | 4 48 44.4 | 48 44.3 | 5.9555 | 7.164 | 2.46 | 3.26 |
| 22 17 19.6 | 175 | 23 26 39.07 | 26 39.07 | 4 48 46.9 | 48 46.8 | +4.9386 | 7.304 | 2.46 | 3.26 |
| 23 17 15.6 | 176 | 23 26 39.02 | 26 39.03 | 4 48 50.2 | 48 50.1 | –5.8416 | 7.398 | 2.46 | 3.26 |
| 24 17 11.7 | 177 | 23 26 38.86 | 26 38.87 | 4 48 54.2 | 48 54.1 | 6.1840 | 7.485 | 2.46 | 3.26 |
| 25 17 7.8 | 178 | 23 26 38.58 | 26 38.59 | 4 48 59.0 | 48 58.9 | 6.3731 | 7.549 | 2.46 | 3.26 |
| 26 17 3.8 | 179 | 23 26 38.18 | 26 38.19 | 4 49 4.5 | 49 4.4 | 6.5044 | 7.612 | 2.46 | 3.26 |
| 27 16 59.9 | 180 | 23 26 37.66 | 26 37.67 | 4 49 10.8 | 49 10.7 | 6.5975 | 7.661 | 2.46 | 3.25 |
| 28 16 55.9 | 181 | 23 26 37.03 | 26 37.04 | 4 49 17.8 | 49 17.8 | 6.6804 | 7.707 | 2.46 | 3.25 |
| 29 16 52.0 | 182 | 23 26 36.28 | 26 36.29 | 4 49 25.6 | 49 25.6 | 6.7554 | 7.749 | 2.46 | 3.25 |
| 30 16 48.0 | 183 | 23 26 35.40 | 26 35.42 | 4 49 34.2 | 49 34.1 | 6.8113 | 7.788 | 2.45 | 3.25 |
| 31 16 44.1 | 184 | 23 26 34.41 | 26 34.43 | – 4 49 43.5 | 49 43.3 | –6.8628 | – 7.824 | –2.45 | –3.24 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of *t* in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| July 1 16 44.1 | 184 | 23 26 34.41 | 26 34.43 | − 4 49 43.5 | 49 43.3 | −6.8628 | − 7.824 | −2.45 | −3.24 |
| 2 16 40.1 | 185 | 23 26 33.30 | 26 33.32 | 4 49 53.5 | 49 53.3 | 6.9098 | 7.857 | 2.45 | 3.24 |
| 3 16 36.2 | 186 | 23 26 32.07 | 26 32.10 | 4 50 4.3 | 50 4.0 | 6.9528 | 7.887 | 2.45 | 3.24 |
| 4 16 32.2 | 187 | 23 26 30.73 | 26 30.76 | 4 50 15.8 | 50 15.5 | 6.9906 | 7.915 | 2.44 | 3.23 |
| 5 16 28.3 | 188 | 23 26 29.27 | 26 29.31 | 4 50 28.0 | 50 27.7 | 7.0238 | 7.939 | 2.44 | 3.23 |
| 6 16 24.3 | 189 | 23 26 27.70 | 26 27.75 | 4 50 40.9 | 50 40.5 | 7.0541 | 7.962 | 2.44 | 3.23 |
| 7 16 20.4 | 190 | 23 26 26.01 | 26 26.07 | 4 50 54.6 | 50 54.1 | 7.0826 | 7.984 | 2.44 | 3.22 |
| 8 16 16.4 | 191 | 23 26 24.22 | 26 24.27 | 4 51 8.9 | 51 8.4 | 7.1094 | 8.006 | 2.43 | 3.22 |
| 9 16 12.5 | 192 | 23 26 22.32 | 26 22.36 | 4 51 23.9 | 51 23.4 | 7.1345 | 8.026 | 2.43 | 3.22 |
| 10 16 8.5 | 193 | 23 26 20.30 | 26 20.34 | 4 51 39.6 | 51 39.1 | 7.1583 | 8.046 | 2.43 | 3.21 |
| 11 16 4.5 | 194 | 23 26 18.17 | 26 18.21 | 4 51 56.0 | 51 55.5 | 7.1807 | 8.064 | 2.42 | 3.21 |
| 12 16 0.5 | 195 | 23 26 15.93 | 26 15.98 | 4 52 13.1 | 52 12.6 | 7.2020 | 8.082 | 2.42 | 3.21 |
| 13 15 56.6 | 196 | 23 26 13.58 | 26 13.64 | 4 52 30.9 | 52 30.4 | 7.2220 | 8.099 | 2.42 | 3.20 |
| 14 15 52.6 | 197 | 23 26 11.13 | 26 11.20 | 4 52 49.3 | 52 48.9 | 7.2411 | 8.115 | 2.41 | 3.20 |
| 15 15 48.6 | 198 | 23 26 8.57 | 26 8.65 | 4 53 8.4 | 53 8.0 | 7.2592 | 8.130 | 2.41 | 3.19 |
| 16 15 44.7 | 199 | 23 26 5.91 | 26 5.99 | 4 53 28.1 | 53 27.7 | 7.2763 | 8.145 | 2.40 | 3.19 |
| 17 15 40.7 | 200 | 23 26 3.14 | 26 3.22 | 4 53 48.5 | 53 48.0 | 7.2925 | 8.159 | 2.40 | 3.18 |
| 18 15 36.7 | 201 | 23 26 0.27 | 26 0.35 | 4 54 9.5 | 54 9.0 | 7.3079 | 8.172 | 2.39 | 3.18 |
| 19 15 32.7 | 202 | 23 25 57.30 | 25 57.38 | 4 54 31.2 | 54 30.7 | 7.3227 | 8.185 | 2.39 | 3.17 |
| 20 15 28.7 | 203 | 23 25 54.23 | 25 54.31 | 4 54 53.5 | 54 53.0 | 7.3369 | 8.197 | 2.38 | 3.17 |
| 21 15 24.7 | 204 | 23 25 51.06 | 25 51.14 | 4 55 16.5 | 55 15.9 | 7.3505 | 8.208 | 2.38 | 3.16 |
| 22 15 20.7 | 205 | 23 25 47.80 | 25 47.87 | 4 55 40.0 | 55 39.5 | 7.3635 | 8.219 | 2.37 | 3.16 |
| 23 15 16.8 | 206 | 23 25 44.43 | 25 44.50 | 4 56 4.2 | 56 3.7 | 7.3760 | 8.229 | 2.37 | 3.15 |
| 24 15 12.8 | 207 | 23 25 40.96 | 25 41.03 | 4 56 28.9 | 56 28.4 | 7.3881 | 8.239 | 2.36 | 3.14 |
| 25 15 8.8 | 208 | 23 25 37.39 | 25 37.47 | 4 56 54.2 | 56 53.7 | 7.3997 | 8.249 | 2.36 | 3.14 |
| 26 15 4.8 | 209 | 23 25 33.73 | 25 33.81 | 4 57 20.1 | 57 19.6 | 7.4109 | 8.258 | 2.35 | 3.13 |
| 27 15 0.8 | 210 | 23 25 29.97 | 25 30.06 | 4 57 46.5 | 57 46.0 | 7.4217 | 8.267 | 2.35 | 3.12 |
| 28 14 56.8 | 211 | 23 25 26.12 | 25 26.21 | 4 58 13.5 | 58 12.9 | 7.4321 | 8.276 | 2.34 | 3.11 |
| 29 14 52.8 | 212 | 23 25 22.18 | 25 22.27 | 4 58 41.0 | 58 40.4 | 7.4421 | 8.285 | 2.34 | 3.10 |
| 30 14 48.8 | 213 | 23 25 18.15 | 25 18.24 | 4 59 9.0 | 59 8.4 | 7.4517 | 8.294 | 2.33 | 3.09 |
| 31 14 44.8 | 214 | 23 25 14.03 | 25 14.13 | 4 59 37.6 | 59 37.0 | 7.4610 | 8.302 | 2.32 | 3.08 |
| Aug. 1 14 40.8 | 215 | 23 25 9.83 | 25 9.93 | 5 0 6.7 | 0 6.0 | 7.4699 | 8.310 | 2.31 | 3.07 |
| 2 14 36.8 | 216 | 23 25 5.54 | 25 5.65 | 5 0 36.3 | 0 35.6 | 7.4784 | 8.318 | 2.30 | 3.06 |
| 3 14 32.8 | 217 | 23 25 1.17 | 25 1.28 | 5 1 6.4 | 1 5.7 | 7.4866 | 8.325 | 2.29 | 3.05 |
| 4 14 28.8 | 218 | 23 24 56.72 | 24 56.83 | 5 1 37.0 | 1 36.3 | 7.4945 | 8.332 | 2.28 | 3.04 |
| 5 14 24.8 | 219 | 23 24 52.19 | 24 52.30 | 5 2 8.1 | 2 7.4 | 7.5020 | 8.338 | 2.27 | 3.03 |
| 6 14 20.8 | 220 | 23 24 47.58 | 24 47.69 | 5 2 39.7 | 2 39.0 | 7.5092 | 8.344 | 2.26 | 3.02 |
| 7 14 16.8 | 221 | 23 24 42.90 | 24 43.01 | 5 3 11.8 | 3 11.0 | 7.5161 | 8.350 | 2.25 | 3.01 |
| 8 14 12.7 | 222 | 23 24 38.15 | 24 38.25 | 5 3 44.3 | 3 43.4 | 7.5227 | 8.356 | 2.24 | 3.00 |
| 9 14 8.7 | 223 | 23 24 33.32 | 24 33.43 | 5 4 17.2 | 4 16.3 | 7.5290 | 8.361 | 2.23 | 2.98 |
| 10 14 4.7 | 224 | 23 24 28.42 | 24 28.53 | 5 4 50.5 | 4 49.6 | 7.5350 | 8.366 | 2.22 | 2.99 |
| 11 14 0.7 | 225 | 23 24 23.45 | 24 23.56 | 5 5 24.2 | 5 23.3 | 7.5407 | 8.371 | 2.21 | 2.98 |
| 12 13 56.7 | 226 | 23 24 18.42 | 24 18.53 | 5 5 58.2 | 5 57.3 | 7.5462 | 8.376 | 2.20 | 2.97 |
| 13 13 52.7 | 227 | 23 24 13.32 | 24 13.44 | 5 6 32.6 | 6 31.7 | 7.5516 | 8.381 | 2.18 | 2.95 |
| 14 13 48.7 | 228 | 23 24 8.16 | 24 8.28 | 5 7 7.4 | 7 6.5 | 7.5569 | 8.385 | 2.17 | 2.93 |
| 15 13 44.6 | 229 | 23 24 2.94 | 24 3.06 | 5 7 42.6 | 7 41.6 | 7.5619 | 8.389 | 2.16 | 2.91 |
| 16 13 40.6 | 230 | 23 23 57.66 | 23 57.78 | 5 8 18.1 | 8 17.1 | 7.5667 | 8.393 | 2.15 | 2.89 |
| 17 13 36.6 | 231 | 23 23 52.32 | 23 52.45 | 5 8 53.8 | 8 52.9 | 7.5714 | 8.397 | 2.13 | 2.87 |
| 18 13 32.6 | 232 | 23 23 46.92 | 23 47.06 | 5 9 29.9 | 9 29.0 | 7.5759 | 8.401 | 2.12 | 2.85 |
| 19 13 28.6 | 233 | 23 23 41.47 | 23 41.61 | 5 10 6.3 | 10 5.4 | 7.5802 | 8.404 | 2.10 | 2.83 |
| 20 13 24.5 | 234 | 23 23 35.97 | 23 36.11 | 5 10 43.0 | 10 42.1 | 7.5842 | 8.408 | 2.08 | 2.81 |
| 21 13 20.5 | 235 | 23 23 30.42 | 23 30.56 | 5 11 19.9 | 11 19.0 | 7.5881 | 8.411 | 2.06 | 2.79 |
| 22 13 16.5 | 236 | 23 23 24.82 | 23 24.96 | 5 11 57.1 | 11 56.2 | 7.5917 | 8.414 | 2.04 | 2.77 |
| 23 13 12.5 | 237 | 23 23 19.17 | 23 19.32 | 5 12 34.6 | 12 33.6 | 7.5952 | 8.417 | 2.02 | 2.74 |
| 24 13 8.4 | 238 | 23 23 13.48 | 23 13.63 | 5 13 12.3 | 13 11.3 | 7.5984 | 8.420 | 2.00 | 2.71 |
| 25 13 4.4 | 239 | 23 23 7.75 | 23 7.90 | 5 13 50.2 | 13 49.2 | 7.6015 | 8.422 | 1.98 | 2.68 |
| 26 13 0.4 | 240 | 23 23 1.98 | 23 2.13 | 5 14 28.3 | 14 27.3 | 7.6044 | 8.424 | 1.95 | 2.65 |
| 27 12 56.4 | 241 | 23 22 56.17 | 22 56.33 | 5 15 6.6 | 15 5.6 | 7.6071 | 8.426 | 1.92 | 2.62 |
| 28 12 52.3 | 242 | 23 22 50.32 | 22 50.49 | 5 15 45.1 | 15 44.1 | 7.6096 | 8.428 | 1.89 | 2.59 |
| 29 12 48.3 | 243 | 23 22 44.44 | 22 44.61 | 5 16 23.7 | 16 22.7 | 7 6120 | 8.430 | 1.86 | −2.56 |
| 30 12 44.3 | 244 | 23 22 38.53 | 22 38.70 | 5 17 2.5 | 17 1.5 | 7.6142 | 8.432 | 1.82 | |
| 31 12 40.3 | 245 | 23 22 32.60 | 22 32.77 | − 5 17 41.4 | 17 40.4 | −7.6162 | − 8.433 | −1.78 | |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of t in Sidereal Minutes. | | Log. Coefficient of t². | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Sept. 1 12 36.2 | 246 | 23 22 26.65 | 22 26.81 | − 5 18 20.5 | 18 19.5 | −7.6180 | − 8.434 | −1.74 | |
| 2 12 32.2 | 247 | 23 22 20.67 | 22 20.83 | 5 18 59.6 | 18 58.6 | 7.6195 | 8.435 | 1.70 | |
| 3 12 28.2 | 248 | 23 22 14.67 | 22 14.83 | 5 19 38.8 | 19 37.8 | 7.6207 | 8.436 | 1.65 | |
| 4 12 24.1 | 249 | 23 22 8.65 | 22 8.81 | 5 20 18.1 | 20 17.1 | 7.6218 | 8.436 | 1.59 | |
| 5 12 20.1 | 250 | 23 22 2.61 | 22 2.77 | 5 20 57.4 | 20 56.4 | 7.6228 | 8.437 | 1.52 | |
| 6 12 16.1 | 251 | 23 21 56.56 | 21 56.72 | 5 21 36.8 | 21 35.8 | 7.6236 | 8.437 | −1.43 | |
| 7 12 12.1 | 252 | 23 21 50.50 | 21 50.66 | 5 22 16.2 | 22 15.2 | 7.6242 | 8.437 | | |
| 8 12 8.0 | 253 | 23 21 44.48 | 21 44.59 | 5 22 55.6 | 22 54.6 | 7.6247 | 8.437 | | |
| 9 12 4.0 | 254 | 23 21 38.35 | 21 38.51 | 5 23 35.0 | 23 34.0 | 7.6251 | 8.436 | | |
| 10 12 0.0 | 255 | 23 21 32.27 | 21 32.43 | 5 24 14.4 | 24 13.4 | 7.6253 | 8.436 | | |
| 11 11 55.9 | 256 | 23 21 26.18 | 21 26.34 | 5 24 53.7 | 24 52.7 | 7.6254 | 8.486 | | |
| 12 11 51.9 | 257 | 23 21 20.09 | 21 20.26 | 5 25 33.0 | 25 32.0 | 7.6253 | 8.435 | | |
| 13 11 47.9 | 258 | 23 21 14.01 | 21 14.17 | 5 26 12.2 | 26 11.2 | 7.6251 | 8.435 | | |
| 14 11 43.8 | 259 | 23 21 7.93 | 21 8.09 | 5 26 51.4 | 26 50.4 | 7.6248 | 8.434 | | |
| 15 11 39.8 | 260 | 23 21 1.86 | 21 2.01 | 5 27 30.5 | 27 29.5 | 7.6244 | 8.433 | | |
| 16 11 35.8 | 261 | 23 20 55.80 | 20 55.95 | 5 28 9.4 | 28 8.4 | 7.6238 | 8.432 | | |
| 17 11 31.7 | 262 | 23 20 49.75 | 20 49.90 | 5 28 48.2 | 28 47.2 | 7.6230 | 8.431 | +1.47 | |
| 18 11 27.7 | 263 | 23 20 43.71 | 20 43.86 | 5 29 26.9 | 29 25.9 | 7.6221 | 8.429 | 1.56 | +2.56 |
| 19 11 23.7 | 264 | 23 20 37.69 | 20 37.84 | 5 30 5.4 | 30 4.4 | 7.6209 | 8.427 | 1.63 | 2.60 |
| 20 11 19.6 | 265 | 23 20 31.68 | 20 31.84 | 5 30 43.8 | 30 42.8 | 7.6195 | 8.425 | 1.69 | 2.64 |
| 21 11 15.6 | 266 | 23 20 25.69 | 20 25.85 | 5 31 22.0 | 31 21.0 | 7.6179 | 8.423 | 1.74 | 2.67 |
| 22 11 11.5 | 267 | 23 20 19.73 | 20 19.89 | 5 32 0.0 | 31 59.0 | 7.6162 | 8.421 | 1.79 | 2.70 |
| 23 11 7.5 | 268 | 23 20 13.79 | 20 13.95 | 5 32 37.8 | 32 36.8 | 7.6143 | 8.419 | 1.83 | 2.73 |
| 24 11 3.5 | 269 | 23 20 7.88 | 20 8.04 | 5 33 15.4 | 33 14.4 | 7.6122 | 8.416 | 1.87 | 2.76 |
| 25 10 59.4 | 270 | 23 20 2.00 | 20 2.16 | 5 33 52.7 | 33 51.7 | 7.6099 | 8.413 | 1.90 | 2.79 |
| 26 10 55.4 | 271 | 23 19 56.16 | 19 56.32 | 5 34 29.8 | 34 28.8 | 7.6075 | 8.410 | 1.93 | 2.82 |
| 27 10 51.4 | 272 | 23 19 50.35 | 19 50.51 | 5 35 6.6 | 35 5.6 | 7.6049 | 8.407 | 1.96 | 2.84 |
| 28 10 47.3 | 273 | 23 19 44.58 | 19 44.74 | 5 35 43.1 | 35 42.1 | 7.6020 | 8.403 | 1.99 | 2.86 |
| 29 10 43.3 | 274 | 23 19 38.84 | 19 39.01 | 5 36 19.3 | 36 18.3 | 7.5989 | 8.399 | 2.01 | 2.88 |
| 30 10 39.3 | 275 | 23 19 33.15 | 19 33.32 | 5 36 55.2 | 36 54.2 | 7.5956 | 8.395 | 2.03 | 2.90 |
| Oct. 1 10 35.3 | 276 | 23 19 27.50 | 19 27.67 | 5 37 30.8 | 37 29.8 | 7.5920 | 8.391 | 2.06 | 2.92 |
| 2 10 31.2 | 277 | 23 19 21.90 | 19 22.07 | 5 38 6.0 | 38 5.1 | 7.5882 | 8.386 | 2.08 | 2.94 |
| 3 10 27.2 | 278 | 23 19 16.35 | 19 16.52 | 5 38 40.8 | 38 40.0 | 7.5841 | 8.382 | 2.10 | 2.96 |
| 4 10 23.2 | 279 | 23 19 10.85 | 19 11.02 | 5 39 15.3 | 39 14.4 | 7.5799 | 8.377 | 2.12 | 2.98 |
| 5 10 19.2 | 280 | 23 19 5.41 | 19 5.57 | 5 39 49.4 | 39 48.4 | 7.5755 | 8.372 | 2.14 | 2.99 |
| 6 10 15.1 | 281 | 23 19 0.02 | 19 0.18 | 5 40 23.0 | 40 22.1 | 7.5708 | 8.366 | 2.16 | 3.00 |
| 7 10 11.1 | 282 | 23 18 54.69 | 18 54.85 | 5 40 56.3 | 40 55.3 | 7.5659 | 8.361 | 2.17 | 3.01 |
| 8 10 7.1 | 283 | 23 18 49.42 | 18 49.58 | 5 41 29.1 | 41 28.2 | 7.5608 | 8.355 | 2.18 | 3.02 |
| 9 10 3.1 | 284 | 23 18 44.22 | 18 44.37 | 5 42 1.5 | 42 0.6 | 7.5555 | 8.349 | 2.19 | 3.03 |
| 10 9 59.1 | 285 | 23 18 39.07 | 18 39.23 | 5 42 33.4 | 42 32.5 | 7.5499 | 8.343 | 2.20 | 3.04 |
| 11 9 55.1 | 286 | 23 18 33.99 | 18 34.15 | 5 43 4.9 | 43 4.0 | 7.5441 | 8.337 | 2.21 | 3.05 |
| 12 9 51.1 | 287 | 23 18 28.99 | 18 29.14 | 5 43 35.9 | 43 35.0 | 7.5381 | 8.330 | 2.22 | 3.06 |
| 13 9 47.1 | 288 | 23 18 24.06 | 18 24.19 | 5 44 6.5 | 44 5.6 | 7.5320 | 8.323 | 2.23 | 3.07 |
| 14 9 43.1 | 289 | 23 18 19.19 | 18 19.32 | 5 44 36.5 | 44 35.6 | 7.5257 | 8.316 | 2.24 | 3.08 |
| 15 9 39.0 | 290 | 23 18 14.39 | 18 14.51 | 5 45 6.0 | 45 5.1 | 7.5191 | 8.308 | 2.25 | 3.09 |
| 16 9 35.0 | 291 | 23 18 9.67 | 18 9.80 | 5 45 35.0 | 45 34.1 | 7.5123 | 8.300 | 2.26 | 3.10 |
| 17 9 31.0 | 292 | 23 18 5.02 | 18 5.15 | 5 46 3.4 | 46 2.6 | 7.5050 | 8.292 | 2.28 | 3.11 |
| 18 9 27.0 | 293 | 23 18 0.46 | 18 0.58 | 5 46 31.3 | 46 30.5 | 7.4974 | 8.284 | 2.29 | 3.12 |
| 19 9 23.0 | 294 | 23 17 55.97 | 17 56.09 | 5 46 58.7 | 46 57.9 | 7.4894 | 8.275 | 2.30 | 3.13 |
| 20 9 19.0 | 295 | 23 17 51.57 | 17 51.69 | 5 47 25.5 | 47 24.7 | 7.4811 | 8.266 | 2.31 | 3.14 |
| 21 9 15.0 | 296 | 23 17 47.25 | 17 47.37 | 5 47 51.7 | 47 50.9 | 7.4725 | 8.256 | 2.32 | 3.15 |
| 22 9 11.0 | 297 | 23 17 43.02 | 17 43.14 | 5 48 17.4 | 48 16.6 | 7.4635 | 8.246 | 2.33 | 3.16 |
| 23 9 7.0 | 298 | 23 17 38.88 | 17 39.00 | 5 48 42.5 | 48 41.7 | 7.4541 | 8.236 | 2.34 | 3.17 |
| 24 9 3.0 | 299 | 23 17 34.83 | 17 34.95 | 5 49 6.9 | 49 6.2 | 7.4442 | 8.225 | 2.35 | 3.18 |
| 25 8 59.0 | 300 | 23 17 30.87 | 17 30.99 | 5 49 30.7 | 49 30.1 | 7.4339 | 8.213 | 2.36 | 3.19 |
| 26 8 55.0 | 301 | 23 17 27.01 | 17 27.12 | 5 49 53.9 | 49 53.3 | 7.4232 | 8.201 | 2.37 | 3.19 |
| 27 8 51.0 | 302 | 23 17 23.24 | 17 23.35 | 5 50 16.5 | 50 15.9 | 7.4120 | 8.188 | 2.38 | 3.20 |
| 28 8 47.0 | 303 | 23 17 19.57 | 17 19.68 | 5 50 38.4 | 50 37.8 | 7.4004 | 8.175 | 2.38 | 3.20 |
| 29 8 43.0 | 304 | 23 17 16.00 | 17 16.10 | 5 50 59.6 | 50 59.1 | 7.3883 | 8.162 | 2.39 | 3.21 |
| 30 8 39.0 | 305 | 23 17 12.53 | 17 12.63 | 5 51 20.2 | 51 19.7 | 7.3756 | 8.148 | 2.39 | 3.22 |
| 31 8 35.0 | 306 | 23 17 9.16 | 17 9.26 | 5 51 40.1 | 51 39.6 | 7.3624 | 8.133 | 2.40 | 3.22 |
| 32 8 31.0 | 307 | 23 17 5.90 | 17 6.00 | − 5 51 59.3 | 51 58.8 | −7.3485 | − 8.118 | +2.40 | +3.23 |

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

| Mean Solar Time of Meridian Transit, which precedes Sid. 0h. | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. Coefficient of $t$ in Sidereal Minutes. | | Log. Coefficient of $t^2$. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | At Sidereal 0h. | At Transit. | At Sidereal 0h. | At Transit. | In R. A. | In Dec. | In R. A. | In Dec. |
| d. | h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Nov. 1 | 8 31.0 | 307 | 23 17 5.90 | 17 6.00 | − 5 51 59.3 | 51 58.8 | −7.3485 | − 8.118 | +2.40 | +3.23 |
| 2 | 8 27.0 | 308 | 23 17 2.74 | 17 2.84 | 5 52 17.8 | 52 17.3 | 7.3340 | 8.102 | 2.41 | 3.23 |
| 3 | 8 23.1 | 309 | 23 16 59.69 | 16 59.79 | 5 52 35.6 | 52 35.1 | 7.3187 | 8.084 | 2.42 | 3.24 |
| 4 | 8 19.1 | 310 | 23 16 56.75 | 16 56.84 | 5 52 52.7 | 52 52.2 | 7.3026 | 8.066 | 2.42 | 3.24 |
| 5 | 8 15.1 | 311 | 23 16 53.91 | 16 54.00 | 5 53 9.1 | 53 8.6 | 7.2857 | 8.046 | 2.43 | 3.25 |
| 6 | 8 11.1 | 312 | 23 16 51.18 | 16 51.27 | 5 53 24.7 | 53 24.3 | 7.2679 | 8.025 | 2.43 | 3.25 |
| 7 | 8 7.2 | 313 | 23 16 48.57 | 16 48.65 | 5 53 39.6 | 53 39.2 | 7.2491 | 8.003 | 2.43 | 3.25 |
| 8 | 8 3.2 | 314 | 23 16 46.07 | 16 43.16 | 5 53 53.8 | 53 53.4 | 7.2294 | 7.980 | 2.44 | 3.25 |
| 9 | 7 59.2 | 315 | 23 16 43.69 | 16 43.76 | 5 54 7.2 | 54 6.8 | 7.2085 | 7.956 | 2.44 | 3.26 |
| 10 | 7 55.3 | 316 | 23 16 41.42 | 16 41.49 | 5 54 19.8 | 54 19.5 | 7.1864 | 7.930 | 2.44 | 3.26 |
| 11 | 7 51.3 | 317 | 23 16 39.26 | 16 39.33 | 5 54 31.7 | 54 31.4 | 7.1629 | 7.902 | 2.45 | 3.26 |
| 12 | 7 47.3 | 318 | 23 16 37.22 | 16 37.29 | 5 54 42.9 | 54 42.6 | 7.1380 | 7.872 | 2.45 | 3.26 |
| 13 | 7 43.4 | 319 | 23 16 35.30 | 16 35.36 | 5 54 53.3 | 54 53.0 | 7.1118 | 7.840 | 2.45 | 3.26 |
| 14 | 7 39.4 | 320 | 23 16 33.49 | 16 33.55 | 5 55 2.9 | 55 2.7 | 7.0846 | 7.805 | 2.45 | 3.27 |
| 15 | 7 35.4 | 321 | 23 16 31.80 | 16 31.85 | 5 55 11.8 | 55 11.6 | 7.0538 | 7.768 | 2.46 | 3.27 |
| 16 | 7 31.5 | 322 | 23 16 30.20 | 16 30.27 | 5 55 19.9 | 55 19.7 | 7.0206 | 7.728 | 2.46 | 3.27 |
| 17 | 7 27.5 | 323 | 23 16 28.78 | 16 28.82 | 5 55 27.3 | 55 27.1 | 6.9847 | 7.685 | 2.46 | 3.27 |
| 18 | 7 23.5 | 324 | 23 16 27.44 | 16 27.48 | 5 55 33.8 | 55 33.7 | 6.9454 | 7.634 | 2.47 | 3.27 |
| 19 | 7 19.6 | 325 | 23 16 26.23 | 16 26.27 | 5 55 39.6 | 55 39.5 | 6.9023 | 7.574 | 2.47 | 3.27 |
| 20 | 7 15.6 | 326 | 23 16 25.14 | 16 25.18 | 5 55 44.6 | 55 44.5 | 6.8544 | 7.505 | 2.47 | 3.28 |
| 21 | 7 11.7 | 327 | 23 16 24.18 | 16 24.21 | 5 55 48.8 | 55 48.7 | 6.7935 | 7.421 | 2.48 | 3.28 |
| 22 | 7 7.7 | 328 | 23 16 23.35 | 16 23.37 | 5 55 52.2 | 55 52.1 | 6.7281 | 7.319 | 2.48 | 3.28 |
| 23 | 7 3.8 | 329 | 23 16 22.64 | 16 22.66 | 5 55 54.8 | 55 54.7 | 6.6478 | 7.184 | 2.48 | 3.28 |
| 24 | 6 59.8 | 330 | 23 16 22.06 | 16 22.07 | 5 55 56.6 | 55 56.5 | 6.5576 | 6.988 | 2.48 | 3.28 |
| 25 | 6 55.9 | 331 | 23 16 21.60 | 16 21.61 | 5 55 57.5 | 55 57.5 | 6.4383 | − 6.592 | 2.48 | 3.28 |
| 26 | 6 51.9 | 332 | 23 16 21.27 | 16 21.28 | 5 55 57.7 | 55 57.7 | 6.2730 | + 6.312 | 2.49 | 3.28 |
| 27 | 6 48.0 | 333 | 23 16 21.06 | 16 21.07 | 5 55 57.0 | 55 57.0 | 5.9877 | 6.883 | 2.49 | 3.29 |
| 28 | 6 44.0 | 334 | 23 16 20.99 | 16 20.99 | 5 55 55.5 | 55 55.5 | −4.8416 | 7.120 | 2.49 | 3.29 |
| 29 | 6 40.1 | 335 | 23 16 21.04 | 16 21.04 | 5 55 53.2 | 55 53.3 | +5.9024 | 7.273 | 2.49 | 3.29 |
| 30 | 6 36.2 | 336 | 23 16 21.22 | 16 21.22 | 5 55 50.1 | 55 50.2 | 6.2395 | 7.386 | 2.49 | 3.29 |
| Dec. 1 | 6 32.3 | 337 | 23 16 21.53 | 16 21.52 | 5 55 46.1 | 55 46.3 | 6.4214 | 7.475 | 2.49 | 3.29 |
| 2 | 6 28.4 | 338 | 23 16 21.97 | 16 21.95 | 5 55 41.4 | 55 41.6 | 6.5406 | 7.558 | 2.49 | 3.29 |
| 3 | 6 24.5 | 339 | 23 16 22.53 | 16 22.51 | 5 55 35.8 | 55 36.0 | 6.6427 | 7.619 | 2.49 | 3.29 |
| 4 | 6 20.5 | 340 | 23 16 23.23 | 16 23.20 | 5 55 29.4 | 55 29.7 | 6.7224 | 7.670 | 2.49 | 3.29 |
| 5 | 6 16.6 | 341 | 23 16 24.05 | 16 24.01 | 5 55 22.2 | 55 22.5 | 6.7910 | 7.717 | 2.49 | 3.29 |
| 6 | 6 12.7 | 342 | 23 16 25.00 | 16 24.95 | 5 55 14.2 | 55 14.5 | 6.8459 | 7.761 | 2.49 | 3.29 |
| 7 | 6 8.8 | 343 | 23 16 26.07 | 16 26.02 | 5 55 5.4 | 55 5.7 | 6.8967 | 7.801 | 2.49 | 3.29 |
| 8 | 6 4.9 | 344 | 23 16 27.27 | 16 27.22 | 5 54 55.7 | 54 56.1 | 6.9454 | 7.838 | 2.49 | 3.29 |
| 9 | 6 1.0 | 345 | 23 16 28.60 | 16 28.55 | 5 54 45.3 | 54 45.7 | 6.9846 | 7.873 | 2.49 | 3.29 |
| 10 | 5 57.1 | 346 | 23 16 30.05 | 16 30.00 | 5 54 34.1 | 54 34.5 | 7.0234 | 7.905 | 2.49 | 3.29 |
| 11 | 5 53.2 | 347 | 23 16 31.63 | 16 31.58 | 5 54 22.1 | 54 22.5 | 7.0578 | 7.935 | 2.48 | 3.29 |
| 12 | 5 49.3 | 348 | 23 16 33.34 | 16 33.28 | 5 54 9.3 | 54 9.7 | 7.0896 | 7.963 | 2.48 | 3.29 |
| 13 | 5 45.4 | 349 | 23 16 35.17 | 16 35.11 | 5 53 55.7 | 53 56.1 | 7.1204 | 7.989 | 2.48 | 3.28 |
| 14 | 5 41.5 | 350 | 23 16 37.13 | 16 37.07 | 5 53 41.3 | 53 41.7 | 7.1491 | 8.013 | 3.48 | 3.28 |
| 15 | 5 37.6 | 351 | 23 16 39.22 | 16 39.15 | 5 53 26.1 | 53 26.5 | 7.1746 | 8.036 | 2.48 | 3.28 |
| 16 | 5 33.7 | 352 | 23 16 41.43 | 16 41.36 | 5 53 10.1 | 53 10.5 | 7.1995 | 8.057 | 2.48 | 3.28 |
| 17 | 5 29.8 | 353 | 23 16 43.77 | 16 43.70 | 5 52 53.3 | 52 53.8 | 7.2218 | 8.077 | 2.48 | 3.28 |
| 18 | 5 25.9 | 354 | 23 16 46.23 | 16 46.16 | 5 52 35.7 | 52 36.2 | 7.2447 | 8.096 | 2.48 | 3.28 |
| 19 | 5 22.0 | 355 | 23 16 48.82 | 16 48.75 | 5 52 17.4 | 52 17.9 | 7.2655 | 8.114 | 2.48 | 3.28 |
| 20 | 5 18.1 | 356 | 23 16 51.53 | 16 51.46 | 5 51 58.3 | 51 58.8 | 7.2856 | 8.131 | 2.48 | 3.27 |
| 21 | 5 14.2 | 357 | 23 16 54.37 | 16 54.29 | 5 51 38.5 | 51 38.9 | 7.3040 | 8.148 | 2.47 | 3.27 |
| 22 | 5 10.3 | 358 | 23 16 57.33 | 16 57.24 | 5 51 17.8 | 51 18.3 | 7.3216 | 8.164 | 2.47 | 3.27 |
| 23 | 5 6.4 | 359 | 23 17 0.41 | 17 0.32 | 5 50 56.4 | 50 56.9 | 7.3389 | 8.179 | 2.47 | 3.27 |
| 24 | 5 2.5 | 360 | 23 17 3.61 | 17 3.52 | 5 50 34.2 | 50 34.7 | 7.3561 | 8.194 | 2.47 | 3.26 |
| 25 | 4 58.6 | 361 | 23 17 6.94 | 17 6.84 | 5 50 11.3 | 50 11.8 | 7.3718 | 8.208 | 2.46 | 3.26 |
| 26 | 4 54.8 | 362 | 23 17 10.39 | 17 10.28 | 5 49 47.6 | 49 48.2 | 7.3867 | 8.222 | 2.46 | 3.26 |
| 27 | 4 51.0 | 363 | 23 17 13.95 | 17 13.84 | 5 49 23.1 | 49 23.8 | 7.4010 | 8.236 | 2.46 | 3.25 |
| 28 | 4 47.1 | 364 | 23 17 17.64 | 17 17.52 | 5 48 57.9 | 48 58.7 | 7.4145 | 8.249 | 2.45 | 3.25 |
| 29 | 4 43.2 | 365 | 23 17 21.44 | 17 21.31 | 5 48 32.0 | 48 32.8 | 7.4281 | 8.262 | 2.45 | 3.25 |
| 30 | 4 39.4 | 366 | 23 17 25.35 | 17 25.22 | 5 48 5.4 | 48 6.2 | 7.4414 | 8.274 | 2.44 | 3.24 |
| 31 | 4 35.6 | 367 | 23 17 29.38 | 17 29.25 | 5 47 38.0 | 47 38.9 | 7.4529 | 8.286 | 2.43 | 3.24 |
| 32 | 4 31.8 | 368 | 23 17 33.53 | 17 33.39 | − 5 47 9.9 | 47 10.9 | +7.4638 | + 8.297 | +2.42 | +3.24 |

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

| 0h. Sidereal Date. | HORIZONTAL PARALLAXES. | | | VERTICAL SEMIDIAMETER. | | | SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN. | | |
|---|---|---|---|---|---|---|---|---|---|
| | ☿ | ♀ | ♂ | ☿ | ♀ | ♂ | ☿ | ♀ | ♂ |
| d. | ″ | ″ | ″ | ″ | ″ | ″ | s. | s. | s. |
| 1 | 5.98 | 10.28 | 6.55 | 2.32 | 10.20 | 3.87 | 0.18 | 0.68 | 0.26 |
| 6 | 6.05 | 9.84 | 6.82 | 2.35 | 9.76 | 4.02 | 0.17 | 0.66 | 0.26 |
| 11 | 6.25 | 9.43 | 7.10 | 2.43 | 9.35 | 4.19 | 0.17 | 0.64 | 0.28 |
| 16 | 6.54 | 9.07 | 7.41 | 2.54 | 9.00 | 4.37 | 0.18 | 0.61 | 0.29 |
| 21 | 6.98 | 8.75 | 7.74 | 2.71 | 8.67 | 4.56 | 0.18 | 0.60 | 0.30 |
| 26 | 7.63 | 8.44 | 8.09 | 2.98 | 8.37 | 4.78 | 0.20 | 0.58 | 0.33 |
| 31 | 8.63 | 8.16 | 8.47 | 3.36 | 8.10 | 5.00 | 0.22 | 0.56 | 0.34 |
| 36 | 10.01 | 7.91 | 8.88 | 3.89 | 7.85 | 5.24 | 0.25 | 0.55 | 0.35 |
| 41 | 11.69 | 7.67 | 9.31 | 4.54 | 7.61 | 5.49 | 0.29 | 0.52 | 0.36 |
| 46 | 13.05 | 7.45 | 9.77 | 5.08 | 7.39 | 5.76 | 0.33 | 0.50 | 0.38 |
| 51 | 13.47 | 7.25 | 10.25 | 5.24 | 7.19 | 6.05 | 0.35 | 0.49 | 0.40 |
| 56 | 12.90 | 7.06 | 10.75 | 5.02 | 7.00 | 6.34 | 0.33 | 0.47 | 0.41 |
| 61 | 11.90 | 6.88 | 11.26 | 4.63 | 6.82 | 6.64 | 0.30 | 0.46 | 0.43 |
| 66 | 10.84 | 6.72 | 11.76 | 4.22 | 6.67 | 6.93 | 0.28 | 0.45 | 0.46 |
| 71 | 9.90 | 6.57 | 12.25 | 3.85 | 6.52 | 7.22 | 0.25 | 0.43 | 0.47 |
| 76 | 9.13 | 6.42 | 12.70 | 3.56 | 6.37 | 7.49 | 0.23 | 0.43 | 0.49 |
| 81 | 8.48 | 6.29 | 13.09 | 3.30 | 6.24 | 7.73 | 0.21 | 0.42 | 0.50 |
| 86 | 7.95 | 6.16 | 13.40 | 3.10 | 6.11 | 7.91 | 0.19 | 0.41 | 0.51 |
| 91 | 7.51 | 6.05 | 13.61 | 2.93 | 6.00 | 8.04 | 0.18 | 0.39 | 0.53 |
| 96 | 7.14 | 5.94 | 13.73 | 2.78 | 5.89 | 8.09 | 0.17 | 0.39 | 0.53 |
| 101 | 6.85 | 5.84 | 13.72 | 2.66 | 5.79 | 8.09 | 0.17 | 0.38 | 0.53 |
| 106 | 6.62 | 5.74 | 13.60 | 2.57 | 5.69 | 8.03 | 0.17 | 0.37 | 0.53 |
| 111 | 6.46 | 5.65 | 13.39 | 2.52 | 5.60 | 7.90 | 0.17 | 0.37 | 0.52 |
| 116 | 6.45 | 5.57 | 13.10 | 2.51 | 5.52 | 7.72 | 0.18 | 0.37 | 0.51 |
| 121 | 6.58 | 5.49 | 12.75 | 2.56 | 5.45 | 7.52 | 0.18 | 0.36 | 0.49 |
| 126 | 6.89 | 5.43 | 12.35 | 2.68 | 5.39 | 7.28 | 0.18 | 0.35 | 0.48 |
| 131 | 7.42 | 5.36 | 11.92 | 2.89 | 5.32 | 7.03 | 0.20 | 0.35 | 0.47 |
| 136 | 8.14 | 5.30 | 11.51 | 3.18 | 5.26 | 6.78 | 0.23 | 0.35 | 0.45 |
| 141 | 9.06 | 5.24 | 11.08 | 3.53 | 5.20 | 6.53 | 0.26 | 0.35 | 0.43 |
| 146 | 10.16 | 5.19 | 10.66 | 3.96 | 5.15 | 6.29 | 0.29 | 0.35 | 0.41 |
| 151 | 11.40 | 5.15 | 10.26 | 4.44 | 5.11 | 6.05 | 0.32 | 0.34 | 0.40 |
| 156 | 12.73 | 5.11 | 9.88 | 4.95 | 5.07 | 5.82 | 0.36 | 0.34 | 0.38 |
| 161 | 14.01 | 5.08 | 9.52 | 5.46 | 5.04 | 5.61 | 0.38 | 0.34 | 0.37 |
| 166 | 15.00 | 5.04 | 9.18 | 5.84 | 5.00 | 5.41 | 0.41 | 0.34 | 0.36 |
| 171 | 15.44 | 5.02 | 8.87 | 6.01 | 4.98 | 5.23 | 0.40 | 0.35 | 0.35 |
| 176 | 15.12 | 4.99 | 8.56 | 5.88 | 4.95 | 5.07 | 0.39 | 0.35 | 0.34 |
| 181 | 14.13 | 4.98 | 8.29 | 5.50 | 4.94 | 4.89 | 0.36 | 0.35 | 0.33 |
| 186 | 12.73 | 4.96 | 8.03 | 4.96 | 4.92 | 4.73 | 0.33 | 0.35 | 0.30 |
| 191 | 11.26 | 4.95 | 7.79 | 4.38 | 4.91 | 4.59 | 0.28 | 0.35 | 0.30 |
| 196 | 9.87 | 4.95 | 7.56 | 3.84 | 4.91 | 4.46 | 0.25 | 0.34 | 0.29 |
| 201 | 8.68 | 4.95 | 7.35 | 3.38 | 4.91 | 4.33 | 0.22 | 0.34 | 0.29 |
| 206 | 7.73 | 4.95 | 7.15 | 3.02 | 4.91 | 4.22 | 0.20 | 0.34 | 0.28 |
| 211 | 7.05 | 4.95 | 6.97 | 2.75 | 4.91 | 4.11 | 0.18 | 0.34 | 0.28 |
| 216 | 6.62 | 4.97 | 6.80 | 2.57 | 4.92 | 4.01 | 0.18 | 0.34 | 0.27 |
| 221 | 6.39 | 4.98 | 6.64 | 2.48 | 4.94 | 3.91 | 0.17 | 0.33 | 0.27 |
| 226 | 6.31 | 5.00 | 6.49 | 2.45 | 4.96 | 3.82 | 0.17 | 0.33 | 0.27 |
| 231 | 6.34 | 5.02 | 6.35 | 2.46 | 4.98 | 3.74 | 0.16 | 0.33 | 0.26 |
| 236 | 6.44 | 5.05 | 6.21 | 2.51 | 5.01 | 3.66 | 0.17 | 0.33 | 0.26 |
| 241 | 6.62 | 5.08 | 6.09 | 2.57 | 5.04 | 3.59 | 0.16 | 0.33 | 0.26 |
| 246 | 6.85 | 5.12 | 5.98 | 2.67 | 5.08 | 3.52 | 0.17 | 0.33 | 0.25 |
| 251 | 7.16 | 5.16 | 5.86 | 2.79 | 5.12 | 3.45 | 0.18 | 0.33 | 0.24 |
| 256 | 7.55 | 5.20 | 5.76 | 2.94 | 5.16 | 3.39 | 0.19 | 0.34 | 0.24 |
| 261 | 8.03 | 5.25 | 5.66 | 3.14 | 5.21 | 3.33 | 0.21 | 0.34 | 0.24 |
| 266 | 8.64 | 5.30 | 5.56 | 3.36 | 5.26 | 3.28 | 0.23 | 0.34 | 0.23 |
| 271 | 9.41 | 5.36 | 5.47 | 3.66 | 5.32 | 3.23 | 0.26 | 0.35 | 0.23 |
| 276 | 10.37 | 5.42 | 5.39 | 4.05 | 5.38 | 3.18 | 0.27 | 0.36 | 0.23 |
| 281 | 11.51 | 5.49 | 5.30 | 4.48 | 5.45 | 3.12 | 0.31 | 0.37 | 0.23 |
| 286 | 12.54 | 5.56 | 5.23 | 4.88 | 5.51 | 3.08 | 0.33 | 0.38 | 0.23 |
| 291 | 12.86 | 5.64 | 5.15 | 5.00 | 5.59 | 3.03 | 0.32 | 0.38 | 0.22 |
| 296 | 12.00 | 5.72 | 5.08 | 4.67 | 5.67 | 2.99 | 0.30 | 0.39 | 0.22 |

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

| 0h. Sidereal Date. | HORIZONTAL PARALLAXES. | | | VERTICAL SEMIDIAMETER. | | | SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN. | | |
|---|---|---|---|---|---|---|---|---|---|
| | ☿ | ♀ | ♂ | ☿ | ♀ | ♂ | ☿ | ♀ | ♂ |
| d. | ″ | ″ | ″ | ″ | ″ | ″ | s. | s. | s. |
| 301 | 10.42 | 5.81 | 5.01 | 4.06 | 5.76 | 2.95 | 0.25 | 0.40 | 0.22 |
| 306 | 8.96 | 5.90 | 4.94 | 3.49 | 5.85 | 2.91 | 0.22 | 0.41 | 0.21 |
| 311 | 7.85 | 6.00 | 4.88 | 3.07 | 5.95 | 2.87 | 0.19 | 0.42 | 0.21 |
| 316 | 7.20 | 6.10 | 4.81 | 2.80 | 6.05 | 2.84 | 0.18 | 0.44 | 0.21 |
| 321 | 6.67 | 6.21 | 4.76 | 2.60 | 6.16 | 2.80 | 0.18 | 0.45 | 0.20 |
| 326 | 6.34 | 6.33 | 4.70 | 2.46 | 6.28 | 2.77 | 0.17 | 0.45 | 0.20 |
| 331 | 6.13 | 6.47 | 4.64 | 2.38 | 6.42 | 2.73 | 0.16 | 0.46 | 0.20 |
| 336 | 5.99 | 6.61 | 4.58 | 2.33 | 6.56 | 2.70 | 0.17 | 0.47 | 0.20 |
| 341 | 5.93 | 6.75 | 4.53 | 2.31 | 6.70 | 2.67 | 0.16 | 0.48 | 0.20 |
| 346 | 5.92 | 6.91 | 4.48 | 2.30 | 6.85 | 2.64 | 0.16 | 0.49 | 0.19 |
| 351 | 5.97 | 7.07 | 4.43 | 2.32 | 7.01 | 2.61 | 0.17 | 0.49 | 0.19 |
| 356 | 6.08 | 7.26 | 4.38 | 2.37 | 7.20 | 2.58 | 0.17 | 0.49 | 0.19 |
| 361 | 6.27 | 6.45 | 4.33 | 2.44 | 7.39 | 2.55 | 0.17 | 0.51 | 0.19 |
| 366 | 6.57 | 7.65 | 4.28 | 2.55 | 7.59 | 2.52 | 0.18 | 0.52 | 0.18 |
| 0h. Sidereal Date. | ♃ | ♄ | ⛢ | ♃ | ♄ | ⛢ | ♃ | ♄ | ⛢ |
| d. | ″ | ″ | ″ | ″ | ″ | ″ | s. | s. | s. |
| 1 | 1.54 | 1.06 | 0.45 | 16.93 | 9.71 | 1.77 | 1.22 | 0.73 | 0.13 |
| 11 | 1.52 | 1.06 | 0.45 | 16.59 | 9.63 | 1.76 | 1.20 | 0.72 | 0.12 |
| 21 | 1.49 | 1.05 | 0.44 | 16.31 | 9.53 | 1.74 | 1.17 | 0.71 | 0.12 |
| 31 | 1.47 | 1.03 | 0.44 | 16.09 | 9.40 | 1.72 | 1.16 | 0.70 | 0.12 |
| 41 | 1.45 | 1.02 | 0.44 | 15.93 | 9.26 | 1.71 | 1.14 | 0.69 | 0.12 |
| 51 | 1.44 | 1.00 | 0.43 | 15.82 | 9.10 | 1.69 | 1.13 | 0.68 | 0.12 |
| 61 | 1.44 | 0.98 | 0.43 | 15.76 | 8.93 | 1.68 | 1.12 | 0.67 | 0.12 |
| 71 | 1.44 | 0.96 | 0.43 | 15.76 | 8.76 | 1.67 | 1.12 | 0.66 | 0.12 |
| 81 | 1.44 | 0.94 | 0.42 | 15.83 | 8.60 | 1.66 | 1.12 | 0.64 | 0.11 |
| 91 | 1.45 | 0.93 | 0.42 | 15.94 | 8.46 | 1.64 | 1.13 | 0.64 | 0.11 |
| 101 | 1.47 | 0.91 | 0.42 | 16.10 | 8.32 | 1.64 | 1.14 | 0.63 | 0.11 |
| 111 | 1.49 | 0.90 | 0.42 | 16.32 | 8.20 | 1.63 | 1.16 | 0.63 | 0.11 |
| 121 | 1.51 | 0.89 | 0.42 | 16.59 | 8.09 | 1.63 | 1.17 | 0.62 | 0.11 |
| 131 | 1.54 | 0.88 | 0.42 | 16.92 | 7.99 | 1.63 | 1.20 | 0.61 | 0.11 |
| 141 | 1.58 | 0.87 | 0.42 | 17.30 | 7.92 | 1.63 | 1.22 | 0.61 | 0.11 |
| 151 | 1.62 | 0.86 | 0.42 | 17.75 | 7.86 | 1.63 | 1.25 | 0.61 | 0.11 |
| 161 | 1.66 | 0.86 | 0.42 | 18.25 | 7.82 | 1.64 | 1.29 | 0.60 | 0.11 |
| 171 | 1.71 | 0.86 | 0.42 | 18.80 | 7.80 | 1.64 | 1.33 | 0.60 | 0.11 |
| 181 | 1.77 | 0.86 | 0.42 | 19.39 | 7.80 | 1.65 | 1.38 | 0.60 | 0.11 |
| 191 | 1.82 | 0.86 | 0.43 | 20.02 | 7.82 | 1.66 | 1.42 | 0.60 | 0.11 |
| 201 | 1.88 | 0.86 | 0.43 | 20.68 | 7.86 | 1.68 | 1.46 | 0.60 | 0.12 |
| 211 | 1.94 | 0.87 | 0.43 | 21.35 | 7.90 | 1.69 | 1.51 | 0.60 | 0.12 |
| 221 | 2.01 | 0.87 | 0.44 | 22.00 | 7.97 | 1.70 | 1.55 | 0.60 | 0.12 |
| 231 | 2.06 | 0.88 | 0.44 | 22.58 | 8.07 | 1.72 | 1.60 | 0.61 | 0.12 |
| 241 | 2.11 | 0.89 | 0.44 | 23.08 | 8.17 | 1.73 | 1.64 | 0.62 | 0.12 |
| 251 | 2.14 | 0.91 | 0.45 | 23.49 | 8.29 | 1.75 | 1.66 | 0.62 | 0.12 |
| 261 | 2.16 | 0.92 | 0.45 | 23.74 | 8.43 | 1.76 | 1.68 | 0.63 | 0.13 |
| 271 | 2.17 | 0.94 | 0.45 | 23.82 | 8.57 | 1.77 | 1.68 | 0.64 | 0.13 |
| 281 | 2.16 | 0.96 | 0.45 | 23.70 | 8.73 | 1.78 | 1.67 | 0.66 | 0.13 |
| 291 | 2.13 | 0.98 | 0.46 | 23.42 | 8.89 | 1.80 | 1.65 | 0.66 | 0.13 |
| 301 | 2.09 | 0.99 | 0.46 | 22.98 | 9.05 | 1.80 | 1.62 | 0.68 | 0.13 |
| 311 | 2.04 | 1.01 | 0.46 | 22.34 | 9.21 | 1.80 | 1.58 | 0.69 | 0.13 |
| 321 | 1.99 | 1.03 | 0.46 | 21.70 | 9.37 | 1.80 | 1.54 | 0.70 | 0.13 |
| 331 | 1.92 | 1.04 | 0.46 | 21.12 | 9.50 | 1.80 | 1.49 | 0.71 | 0.13 |
| 341 | 1.86 | 1.05 | 0.46 | 20.44 | 9.61 | 1.80 | 1.44 | 0.72 | 0.13 |
| 351 | 1.80 | 1.06 | 0.46 | 19.76 | 9.68 | 1.79 | 1.39 | 0.73 | 0.13 |
| 361 | 1.74 | 1.07 | 0.46 | 19.12 | 9.72 | 1.78 | 1.35 | 0.73 | 0.13 |
| 371 | 1.68 | 1.08 | 0.46 | 18.52 | 9.75 | 1.77 | 1.31 | 0.73 | 0.13 |

NOTE. — For Neptune the Horizontal Parallax = 0″.28 (before 145d. and after 345d.)
" " " " = 0″.29 (between 145d. and 345d.)

# SUN'S COÖRDINATES, 1856.

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 9.9 |
| Jan. 1.0 | +.1800258 | 0659 | —.8867099 | 7173 | —.3848141 | 7792 | 280 33 0.5 | 9.1 | +0.09 | 926561 |
| 1.5 | .1886198 | 6592 | .8852084 | 2158 | .3841629 | 1279 | 281 3 36.4 | 44.2 | +0.02 | 26572 |
| 2.0 | .1971994 | 2380 | .8836377 | 6449 | .3834816 | 4467 | 281 34 11.6 | 19.3 | —0.05 | 26592 |
| 2.5 | .2057640 | 8019 | .8819981 | :0050 | .3827703 | 7354 | 282 4 46.8 | 54.4 | 0.12 | 26618 |
| 3.0 | .2143128 | 3500 | .8802892 | 2959 | .3820291 | :9942 | 282 35 22.4 | 29.9 | 0.18 | 26648 |
| 3.5 | +.2228452 | 8817 | —.8785118 | 5183 | —.3812581 | 2233 | 283 5 57.7 | 65.1 | —0.24 | 926683 |
| 4.0 | .2313605 | 3962 | .8766655 | 6718 | .3804572 | 4224 | 283 36 33.3 | 40.6 | 0.30 | 26723 |
| 4.5 | .2398581 | 8931 | .8747508 | 7568 | .3796264 | 5916 | 284 7 8.7 | 15.9 | 0.36 | 26766 |
| 5.0 | .2483373 | 3714 | .8727676 | 7734 | .3787660 | 7312 | 284 37 44.4 | 51.5 | 0.41 | 26814 |
| 5.5 | .2567973 | 8307 | .8707161 | 7217 | .3778758 | 8411 | 285 8 19.9 | 26.9 | 0.45 | 26866 |
| 6.0 | +.2652371 | 2698 | —.8685966 | 6021 | —.3769562 | 9215 | 285 38 55.4 | 62.3 | —0.49 | 926923 |
| 6.5 | .2736561 | 6881 | .8664092 | 4145 | .3760069 | :9723 | 286 9 30.8 | 37.6 | 0.51 | 26984 |
| 7.0 | .2820536 | 0848 | .8641541 | 1593 | .3750284 | :9939 | 286 40 6.1 | 12.8 | 0.53 | 27049 |
| 7.5 | .2904290 | 4594 | .8618314 | 8365 | .3740206 | :9861 | 287 10 41.4 | 48.1 | 0.54 | 27123 |
| 8.0 | .2987817 | 8115 | .8594415 | 4465 | .3729835 | 9491 | 287 41 16.6 | 23.1 | 0.55 | 27192 |
| 8.5 | +.3071110 | 1401 | —.8569842 | 9891 | —.3719172 | 8828 | 288 11 51.7 | 58.1 | —0.56 | 927270 |
| 9.0 | .3154162 | 4447 | .8544601 | 4648 | .3708218 | 7875 | 288 42 26.8 | 33.1 | 0.57 | 27352 |
| 9.5 | .3236967 | 7244 | .8518691 | 8737 | .3696975 | 6632 | 289 13 1.7 | 7.9 | 0.55 | 27438 |
| 10.0 | .3319516 | 9786 | .8492117 | 2162 | .3685440 | 5099 | 289 43 36.7 | 42.8 | 0.52 | 27529 |
| 10.5 | .3401800 | 2065 | .8464880 | 4924 | .3673619 | 3277 | 290 14 11.4 | 17.4 | 0.48 | 27624 |
| 11.0 | +.3483814 | 4075 | —.8436986 | 7028 | —.3661509 | 1167 | 290 44 46.0 | 51.9 | —0.44 | 927723 |
| 11.5 | .3565553 | 5810 | .8408431 | 8472 | .3649115 | 8774 | 291 15 20.4 | 26.3 | 0.40 | 27826 |
| 12.0 | .3647012 | 7265 | .8379221 | 9261 | .3636437 | 6096 | 291 45 54.6 | 0.4 | 0.35 | 27934 |
| 12.5 | .3728183 | 8432 | .8349359 | 9398 | .3623476 | 3135 | 292 16 28.7 | 34.4 | 0.31 | 28046 |
| 13.0 | .3809060 | 9304 | .8318849 | 8887 | .3610233 | 9893 | 292 47 2.6 | 8.3 | 0.26 | 28165 |
| 13.5 | +.3889639 | 9879 | —.8287692 | 7729 | —.3596710 | 6370 | 293 17 36.3 | 41.9 | —0.20 | 928288 |
| 14.0 | .3969912 | :0148 | .8255894 | 5930 | .3582907 | 2568 | 293 48 9.8 | 15.3 | 0.14 | 28417 |
| 14.5 | .4049873 | :0105 | .8223454 | 3489 | .3568826 | 8487 | 294 18 43.1 | 48.5 | 0.08 | 28551 |
| 15.0 | .4129514 | 9743 | .8190377 | 0411 | .3554468 | 4129 | 294 49 16.3 | 21.6 | —0.01 | 28691 |
| 15.5 | .4208832 | 9056 | .8156665 | 6698 | .3539835 | 9497 | 295 19 49.2 | 54.4 | +0.06 | 28856 |
| 16.0 | +.4287819 | 8038 | —.8122322 | 2355 | —.3524928 | 4591 | 295 50 21.9 | 27.0 | +0.12 | 928988 |
| 16.5 | .4366470 | 6684 | .8087349 | 7382 | .3509748 | 9412 | 296 20 54.4 | 59.4 | 0.18 | 29145 |
| 17.0 | .4444779 | 4988 | .8051751 | 1784 | .3494296 | 3961 | 296 51 26.8 | 31.7 | 0.24 | 29308 |
| 17.5 | .4522742 | 2947 | .8015530 | 5563 | .3478576 | 8241 | 297 21 58.9 | 63.7 | 0.30 | 29477 |
| 18.0 | .4600351 | 0551 | .7978691 | 8724 | .3462565 | 2251 | 297 52 30.8 | 35.5 | 0.36 | 29652 |
| 18.5 | +.4677601 | 7796 | —.7941235 | 1268 | —.3446328 | 5995 | 298 23 2.4 | 7.0 | +0.40 | 929834 |
| 19.0 | .4754488 | 4679 | .7903167 | 3200 | .3429805 | 9473 | 298 53 33.9 | 38.5 | 0.44 | 30023 |
| 19.5 | .4831006 | 1192 | .7864487 | 4520 | .3413019 | 2688 | 299 24 5.1 | 9.6 | 0.47 | 30218 |
| 20.0 | .4907148 | 7330 | .7825202 | 5235 | .3395968 | 5637 | 299 54 36.2 | 40.6 | 0.49 | 30421 |
| 20.5 | .4982909 | 3088 | .7785311 | 5344 | .3378657 | 8327 | 300 25 7.1 | 11.5 | 0.51 | 30629 |
| 21.0 | +.5058285 | 8459 | —.7744821 | 4854 | —.3361083 | 0765 | 300 55 37.8 | 42.1 | +0.52 | 930844 |
| 21.5 | .5133270 | 3440 | .7703781 | 3766 | .3343252 | 2925 | 301 26 8.2 | 12.4 | 0.54 | 31067 |
| 22.0 | .5207859 | 8025 | .7662048 | 2081 | .3325162 | 4837 | 301 56 38.4 | 42.5 | 0.56 | 31296 |
| 22.5 | .5282048 | 2211 | .7619776 | 9809 | .3306818 | 6495 | 302 27 8.4 | 12.4 | 0.58 | 31532 |
| 23.0 | .5355831 | 5989 | .7576920 | 6953 | .3288217 | 7895 | 302 57 38.3 | 42.2 | 0.60 | 31776 |
| 23.5 | +.5429200 | 9854 | —.7533479 | 3507 | —.3269363 | 9043 | 303 28 8.9 | 11.8 | +0.58 | 932026 |
| 24.0 | .5502152 | 2302 | .7489442 | 9475 | .3250257 | :9939 | 303 58 37.6 | 41.4 | 0.54 | 32283 |
| 24.5 | .5574682 | 4828 | .7444832 | 4865 | .3230901 | 0584 | 304 29 6.9 | 10.6 | 0.49 | 32546 |
| 25.0 | .5646781 | 6923 | .7399646 | 9679 | .3211294 | 0979 | 304 59 36.1 | 39.7 | 0.43 | 32815 |
| 25.5 | .5718446 | 8583 | .7353886 | 3921 | .3191440 | 1126 | 305 30 5.1 | 8.6 | 0.37 | 33090 |
| 26.0 | +.5789671 | 9804 | —.7307559 | 7593 | —.3171338 | 1026 | 306 0 34.0 | 37.4 | +0.30 | 933371 |
| 26.5 | .5860454 | 0582 | .7260669 | 0700 | .3150990 | 0680 | 306 31 2.6 | 5.9 | 0.23 | 33657 |
| 27.0 | .5930787 | 0911 | .7213206 | 3242 | .3130398 | 0090 | 307 1 31.1 | 34.3 | 0.16 | 33950 |
| 27.5 | .6000667 | 0787 | .7165191 | 5228 | .3109565 | 9259 | 307 31 59.4 | 62.5 | 0.08 | 34248 |
| 28.0 | .6070085 | 0200 | .7116619 | 6656 | .3088489 | 8184 | 308 2 27.6 | 30.6 | +0.00 | 34553 |
| 28.5 | +.6139037 | 9148 | —.7067496 | 7534 | —.3067175 | 6872 | 308 32 55.5 | 58.4 | —0.07 | 934862 |
| 29.0 | .6207516 | 7623 | .7017825 | 7864 | .3045622 | 5321 | 309 3 23.3 | 26.1 | 0.14 | 35178 |
| 29.5 | .6275517 | 5620 | .6967608 | 7648 | .3023833 | 3534 | 309 33 50.8 | 53.5 | 0.21 | 35498 |
| 30.0 | .6343034 | 3133 | .6916850 | 6890 | .3001808 | 1511 | 310 4 18.2 | 20.9 | 0.27 | 35824 |
| 30.5 | .6410065 | 0160 | .6865554 | 5596 | .2979550 | 9256 | 310 34 45.3 | 47.9 | 0.33 | 36154 |
| 31.0 | +.6476602 | 6693 | —.6813728 | 3771 | —.2957060 | 6768 | 311 5 12.3 | 14.8 | —0.39 | 936488 |

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X'. | Y. | Y'. | Z. | Z'. | λ = ☉'s True Longitude. | λ' | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 9.9 |
| Jan. 31.5 | +.6542640 | 2727 | —.6761368 | 1412 | —.2934340 | 4051 | 311 35 39.1 | 41.5 | —0.44 | 936826 |
| Feb. 1.0 | .6608175 | 8258 | .6708482 | 8527 | .2911392 | 1105 | 312 6 5.7 | 8.0 | 0.49 | 37169 |
| 1.5 | .6673201 | 3281 | .6655074 | 5120 | .2888218 | 7934 | 312 36 32.0 | 34.3 | 0.54 | 37515 |
| 2.0 | .6737711 | 7787 | .6601147 | 1194 | .2864817 | 4535 | 313 6 58.2 | 60.4 | 0.58 | 37865 |
| 2.5 | .6801700 | 1772 | .6546706 | 6754 | .2841194 | 0915 | 313 37 24.1 | 26.3 | 0.61 | 38217 |
| 3.0 | +.6865164 | 5232 | —.6491756 | 1805 | —.2817348 | 7072 | 314 7 49.8 | 51.9 | —0.63 | 938574 |
| 3.5 | .6928098 | 8163 | .6436301 | 6351 | .2793282 | 3009 | 314 38 15.3 | 17.3 | 0.65 | 38933 |
| 4.0 | .6990494 | 0556 | .6380348 | 0399 | .2768999 | 8729 | 315 8 40.4 | 42.3 | 0.66 | 39297 |
| 4.5 | .7052350 | 2409 | .6323899 | 3951 | .2744502 | 4235 | 315 39 5.3 | 7.1 | 0.66 | 39663 |
| 5.0 | .7113658 | 3714 | .6266959 | 7012 | .2719790 | 9526 | 316 9 29.9 | 31.6 | 0.66 | 40033 |
| 5.5 | +.7174413 | 4466 | —.6209533 | 9588 | —.2694867 | 4606 | 316 39 54.1 | 55.8 | —0.65 | 940404 |
| 6.0 | .7234613 | 4663 | .6151626 | 1682 | .2669736 | 9478 | 317 10 18.0 | 19.6 | 0.63 | 40780 |
| 6.5 | .7294253 | 4300 | .6093242 | 3299 | .2644398 | 4143 | 317 40 41.6 | 43.1 | 0.60 | 41158 |
| 7.0 | .7353326 | 3370 | .6034390 | 4448 | .2618856 | 8604 | 318 11 4.8 | 6.2 | 0.56 | 41540 |
| 7.5 | .7411830 | 1871 | .5975071 | 5131 | .2593111 | 2862 | 318 41 27.7 | 29.0 | 0.52 | 41924 |
| 8.0 | +.7469761 | 9799 | —.5915292 | 5353 | —.2567166 | 6920 | 319 11 50.2 | 51.4 | —0.48 | 942312 |
| 8.5 | .7527112 | 7147 | .5855065 | 5117 | .2541022 | 0779 | 319 42 12.4 | 13.6 | 0.43 | 42702 |
| 9.0 | .7583879 | 3912 | .5794368 | 4431 | .2514682 | 4442 | 320 12 34.2 | 35.3 | 0.38 | 43097 |
| 9.5 | .7640059 | 0089 | .5733234 | 3297 | .2488147 | 7910 | 320 42 55.6 | 56.6 | 0.32 | 43493 |
| 10.0 | .7695645 | 5673 | .5671660 | 1726 | .2461422 | 1188 | 321 13 16.7 | 17.6 | 0.25 | 43894 |
| 10.5 | +.7750636 | 0661 | —.5609650 | 9717 | —.2434508 | 4277 | 321 43 37.3 | 38.1 | —0.19 | 944297 |
| 11.0 | .7805028 | 5051 | .5547211 | 7280 | .2407407 | 7179 | 322 13 57.5 | 58.2 | 0.12 | 44704 |
| 11.5 | .7858817 | 8838 | .5484347 | 4418 | .2380120 | :9896 | 322 44 17.2 | 17.9 | —0.06 | 45114 |
| 12.0 | .7912000 | 2018 | .5421064 | 1137 | .2352653 | 2432 | 323 14 36.6 | 37.2 | +0.01 | 45529 |
| 12.5 | .7964574 | 4590 | .5357367 | 7441 | .2325008 | 4791 | 323 44 55.5 | 56.0 | 0.07 | 45947 |
| 13.0 | +.8016533 | 6547 | —.5293260 | 3337 | —.2297184 | 6970 | 324 15 14.0 | 14.5 | +0.14 | 946369 |
| 13.5 | .8067873 | 7885 | .5228751 | 8829 | .2269185 | 8975 | 324 45 32.0 | 32.4 | 0.20 | 46795 |
| 14.0 | .8118590 | 8600 | .5163845 | 3925 | .2241014 | 0808 | 325 15 49.7 | 50.1 | 0.26 | 47226 |
| 14.5 | .8168682 | 8690 | .5098545 | 8626 | .2212674 | 2471 | 325 46 06.8 | 7.1 | 0.29 | 47661 |
| 15.0 | .8218148 | 8154 | .5032858 | 2941 | .2184165 | 3965 | 326 16 23.6 | 23.8 | 0.33 | 48100 |
| 15.5 | +.8266982 | 6985 | —.4966789 | 6874 | —.2155490 | 5293 | 326 46 39.8 | 40.0 | +0.36 | 948544 |
| 16.0 | .8315183 | 5185 | .4900344 | 0430 | .2126652 | 6458 | 327 16 55.6 | 55.7 | 0.40 | 48992 |
| 16.5 | .8362747 | 2748 | .4833527 | 3614 | .2097653 | 7462 | 327 47 10.9 | 10.9 | 0.41 | 49445 |
| 17.0 | .8409672 | 9671 | .4766342 | 6431 | .2068495 | 8307 | 328 17 25.9 | 25.9 | 0.43 | 49902 |
| 17.5 | .8455954 | 5951 | .4698798 | 8888 | .2039182 | 8997 | 328 47 40.3 | 40.2 | 0.44 | 50365 |
| 18.0 | +.8501591 | 1586 | —.4630897 | 0989 | —.2009714 | 9532 | 329 17 54.3 | 54.2 | +0.46 | 950832 |
| 18.5 | .8546577 | 6570 | .4562645 | 2738 | .1980095 | :9916 | 329 48 7.8 | 7.6 | 0.45 | 51305 |
| 19.0 | .8590911 | 0902 | .4494046 | 4141 | .1950325 | 0150 | 330 18 21.0 | 20.7 | 0.43 | 51783 |
| 19.5 | .8634591 | 4580 | .4425105 | 5201 | .1920407 | 0235 | 330 48 33.7 | 33.3 | 0.41 | 52266 |
| 20.0 | .8677614 | 7602 | .4355828 | 5926 | .1890343 | 0174 | 331 18 46.1 | 45.7 | 0.38 | 52754 |
| 20.5 | +.8719979 | 9966 | —.4286220 | 6319 | —.1860136 | :9971 | 331 48 58.0 | 57.5 | +0.34 | 953247 |
| 21.0 | .8761682 | 1668 | .4216284 | 6384 | .1829788 | 9626 | 332 19 9.5 | 8.9 | 0.29 | 53744 |
| 21.5 | .8802721 | 2706 | .4146027 | 6128 | .1799301 | 9143 | 332 49 20.6 | 19.5 | 0.25 | 54247 |
| 22.0 | .8843092 | 3075 | .4075456 | 5558 | .1768677 | 8523 | 333 19 31.4 | 30.8 | 0.20 | 54754 |
| 22.5 | .8882791 | 2772 | .4004572 | 4676 | .1737918 | 7768 | 333 49 41.7 | 41.0 | 0.15 | 55266 |
| 23.0 | +.8921816 | 1796 | —.3933384 | 3489 | —.1707027 | 6881 | 334 19 51.7 | 51.0 | +0.09 | 955783 |
| 23.5 | .8960164 | 0143 | .3861893 | 1999 | .1676005 | 5862 | 334 50 1.3 | 0.5 | +0.02 | 56304 |
| 24.0 | .8997832 | 7810 | .3790107 | 0215 | .1644855 | 4716 | 335 20 10.5 | 9.6 | —0.05 | 56829 |
| 24.5 | .9034819 | 4797 | .3718034 | 8141 | .1613580 | 3445 | 335 50 19.3 | 18.3 | 0.12 | 57358 |
| 25.0 | .9071122 | 1100 | .3645669 | 5779 | .1582181 | 2049 | 336 20 27.8 | 26.8 | 0.19 | 57892 |
| 25.5 | +.9106737 | 6715 | —.3573028 | 3140 | —.1550659 | 0531 | 336 50 35.8 | 34.7 | —0.26 | 958429 |
| 26.0 | .9141662 | 1640 | .3500117 | 0230 | .1519019 | 8895 | 337 20 43.4 | 42.3 | 0.33 | 58970 |
| 26.5 | .9175893 | 5871 | .3426933 | 7047 | .1487260 | 7141 | 337 50 50.6 | 49.4 | 0.39 | 59515 |
| 27.0 | .9209428 | 9406 | .3353489 | 3604 | .1455391 | 5274 | 338 20 57.5 | 56.3 | 0.45 | 60062 |
| 27.5 | .9242265 | 2243 | .3279785 | 9902 | .1423407 | 3293 | 338 51 4.1 | 2.8 | 0.51 | 60613 |
| 28.0 | +.9274400 | 4378 | —.3205828 | 5946 | —.1391313 | 1202 | 339 21 10.3 | 9.0 | —0.56 | 961166 |
| 28.5 | .9305830 | 5808 | .3131625 | 1745 | .1359111 | 9004 | 339 51 16.1 | 14.7 | 0.61 | 61723 |
| 29.0 | .9336555 | 6532 | .3057175 | 7296 | .1326804 | 6701 | 340 21 21.6 | 20.1 | 0.65 | 62283 |
| 29.5 | .9366573 | 6550 | .2982490 | 2612 | .1294395 | 4296 | 340 51 26.7 | 25.2 | 0.68 | 62844 |
| Mar. 1.0 | .9395879 | 5857 | .2907576 | 7699 | .1261885 | 1790 | 341 21 31.4 | 29.8 | 0.71 | 63408 |
| 1.5 | +.9424473 | 4451 | —.2832437 | 2561 | —.1229277 | 9186 | 341 51 35.6 | 34.0 | —0.73 | 963972 |

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | β = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 9.9 |
| Mar. 2.0 | +.9452351 | 2329 | —.2757082 | 7207 | —.1196575 | 6487 | 342 21 39.5 | 37.8 | —0.75 | 964539 |
| 2.5 | .9479508 | 9486 | .2681513 | 1639 | .1163779 | 3695 | 342 51 42.9 | 41.2 | 0.76 | 65107 |
| 3.0 | .9505945 | 5923 | .2605740 | 5866 | .1130895 | 0815 | 343 21 46.0 | 44.2 | 0.76 | 65677 |
| 3.5 | .9531660 | 1638 | .2529764 | 9892 | .1097923 | 7847 | 343 51 48.6 | 46.8 | 0.75 | 66248 |
| 4.0 | .9556652 | 6630 | .2453596 | 3726 | .1064866 | 4794 | 344 21 50.8 | 48.9 | 0.72 | 66821 |
| 4.5 | +.9580917 | 0894 | —.2377241 | 7372 | —.1031728 | 1659 | 344 51 52.5 | 50.6 | —0.70 | 967395 |
| 5.0 | .9604451 | 4428 | .2300705 | 0837 | .0998511 | 8446 | 345 21 53.8 | 51.8 | 0.67 | 67971 |
| 5.5 | .9627259 | 7236 | .2223994 | 4127 | .0965216 | 5155 | 345 51 54.6 | 52.5 | 0.63 | 68545 |
| 6.0 | .9649333 | 9310 | .2147114 | 7249 | .0931849 | 1792 | 346 21 54.8 | 52.6 | 0.59 | 69122 |
| 6.5 | .9670675 | 0652 | .2070071 | 0207 | .0898411 | 8358 | 346 51 54.7 | 52.5 | 0.55 | 69698 |
| 7.0 | +.9691281 | 1258 | —.1992870 | 3008 | —.0864903 | 4854 | 347 21 54.0 | 51.7 | —0.50 | 970276 |
| 7.5 | .9711150 | 1127 | .1915518 | 5657 | .0831330 | 1286 | 347 51 53.0 | 50.7 | 0.44 | 70853 |
| 8.0 | .9730282 | 0259 | .1838019 | 8159 | .0797695 | 7656 | 348 21 51.4 | 19.0 | 0.38 | 71433 |
| 8.5 | .9748675 | 8652 | .1760381 | 0524 | .0763998 | 8964 | 348 51 49.3 | 46.9 | 0.32 | 72011 |
| 9.0 | .9766331 | 6308 | .1682613 | 2756 | .0730245 | 0216 | 349 21 46.7 | 44.2 | 0.25 | 72591 |
| 9.5 | +.9783246 | 3223 | —.1604721 | 4866 | —.0696436 | 6412 | 349 51 43.6 | 41.0 | —0.19 | 973171 |
| 10.0 | .9799424 | 9401 | .1526706 | 6855 | .0662577 | 2559 | 350 21 40.0 | 37.4 | 0.12 | 73753 |
| 10.5 | .9814859 | 4837 | .1448584 | 8731 | .0628668 | 8655 | 350 51 35.7 | 33.0 | —0.06 | 74334 |
| 11.0 | .9829548 | 9527 | .1370356 | 0504 | .0594715 | 4707 | 351 21 30.9 | 28.2 | 0.00 | 74917 |
| 11.5 | .9843495 | 3475 | .1292027 | 2176 | .0560719 | 0716 | 351 51 25.5 | 22.7 | +0.06 | 75500 |
| 12.0 | +.9856700 | 6681 | —.1213604 | 3754 | —.0526682 | 6680 | 352 21 19.5 | 16.7 | +0.12 | 976086 |
| 12.5 | .9869160 | 9142 | .1135090 | 5241 | .0492605 | 2612 | 352 51 13.0 | 10.1 | 0.17 | 76672 |
| 13.0 | .9880879 | 0862 | .1056494 | 6646 | .0458494 | 8506 | 353 21 6.0 | 3.1 | 0.23 | 77260 |
| 13.5 | .9891854 | 1838 | .0977823 | 7976 | .0424350 | 4368 | 353 50 58.4 | 55.4 | 0.26 | 77848 |
| 14.0 | .9902088 | 2073 | .0899082 | 9236 | .0390175 | 0198 | 354 20 50.3 | 47.3 | 0.30 | 78438 |
| 14.5 | +.9911578 | 1564 | —.0820278 | 0433 | —.0355973 | 6001 | 354 50 41.5 | 38.4 | +0.32 | 979030 |
| 15.0 | .9920324 | 0311 | .0741416 | 1572 | .0321746 | 1779 | 355 20 32.2 | 29.1 | 0.34 | 79624 |
| 15.5 | .9928326 | 8315 | .0662502 | 2659 | .0287499 | 7535 | 355 50 22.3 | 19.2 | 0.35 | 80220 |
| 16.0 | .9935586 | 5576 | .0583541 | 3699 | .0253229 | 3271 | 356 20 11.8 | 8.6 | 0.36 | 80818 |
| 16.5 | .9942102 | 2093 | .0504539 | 4699 | .0218944 | 8991 | 356 49 60.8 | 57.5 | 0.35 | 81418 |
| 17.0 | +.9947876 | 7869 | —.0425503 | 5664 | —.0184644 | 4695 | 357 19 49.3 | 46.0 | +0.34 | 982020 |
| 17.5 | .9952907 | 2901 | .0346438 | 6600 | .0150332 | 0388 | 357 49 37.1 | 33.7 | 0.32 | 82624 |
| 18.0 | .9957196 | 7191 | .0267350 | 7513 | .0116010 | 6071 | 358 19 24.4 | 21.0 | 0.30 | 83231 |
| 18.5 | .9960742 | 0738 | .0188245 | 8410 | .0081681 | 1746 | 358 49 11.2 | 7.7 | 0.26 | 83839 |
| 19.0 | .9963548 | 3545 | .0109127 | 9293 | .0047347 | 7417 | 359 18 57.4 | 53.9 | 0.22 | 84450 |
| 19.5 | +.9965611 | 5609 | —.0030005 | 0172 | —.0013010 | 3085 | 359 48 43.0 | 39.4 | +0.19 | 985063 |
| 20.0 | .9966935 | 6935 | +.0049121 | 8953 | +.0021327 | 1247 | 0 18 28.1 | 24.4 | 0.15 | 85679 |
| 20.5 | .9967516 | 7518 | .0128240 | 8070 | .0055660 | 5576 | 0 48 12.6 | 8.9 | 0.09 | 86297 |
| 21.0 | .9967359 | 7363 | .0207349 | 7180 | .0089990 | 9902 | 1 17 56.6 | 52.8 | +0.02 | 86918 |
| 21.5 | .9966461 | 6467 | .0286446 | 6277 | .0124312 | 4220 | 1 47 40.2 | 36.4 | —0.05 | 87540 |
| 22.0 | +.9964825 | 4833 | +.0365524 | 5354 | +.0158627 | 8531 | 2 17 23.2 | 19.3 | —0.12 | 988165 |
| 22.5 | .9962449 | 2459 | .0444576 | 4405 | .0192930 | 2830 | 2 47 05.9 | 2.0 | 0.19 | 88793 |
| 23.0 | .9959334 | 9346 | .0523596 | 3425 | .0227220 | 7116 | 3 16 48.0 | 44.0 | 0.26 | 89424 |
| 23.5 | .9955480 | 5494 | .0602579 | 2407 | .0261493 | 1385 | 3 46 29.7 | 25.7 | 0.32 | 90055 |
| 24.0 | .9950888 | 0904 | .0681516 | 1344 | .0295748 | 5636 | 4 16 10.8 | 6.7 | 0.38 | 90689 |
| 24.5 | +.9945558 | 5576 | +.0760401 | 0228 | +.0329982 | 9866 | 4 45 51.4 | 47.3 | —0.44 | 991323 |
| 25.0 | .9939491 | 9511 | .0839229 | 9055 | .0364193 | 4073 | 5 15 31.6 | 27.4 | 0.51 | 91960 |
| 25.5 | .9932686 | 2708 | .0918007 | 7832 | .0398377 | 8253 | 5 45 11.3 | 7.1 | 0.57 | 92597 |
| 26.0 | .9925145 | 5169 | .0996722 | 6546 | .0432533 | 2405 | 6 14 50.6 | 46.3 | 0.63 | 93237 |
| 26.5 | .9916867 | 6893 | .1075365 | 5188 | .0466659 | 6527 | 6 44 29.4 | 25.1 | 0.67 | 93878 |
| 27.0 | +.9907853 | 7881 | +.1153933 | 3755 | +.0500754 | 0618 | 7 14 7.9 | 3.5 | —0.72 | 994519 |
| 27.5 | .9898104 | 8135 | .1232418 | 2239 | .0534814 | 4674 | 7 43 45.9 | 41.4 | 0.75 | 95160 |
| 28.0 | .9887619 | 7652 | .1310815 | 0635 | .0568836 | 8692 | 8 13 23.6 | 19.1 | 0.78 | 95802 |
| 28.5 | .9876400 | 6435 | .1389116 | 8935 | .0602817 | 2668 | 8 42 60.6 | 56.0 | 0.80 | 96443 |
| 29.0 | .9864448 | 4486 | .1467318 | 7136 | .0636755 | 6602 | 9 12 37.3 | 32.7 | 0.82 | 97085 |
| 29.5 | +.9851763 | 1803 | +.1545413 | 5230 | +.0670647 | 0490 | 9 42 13.4 | 8.7 | —0.83 | 997726 |
| 30.0 | .9838348 | 8391 | .1623399 | 3214 | .0704491 | 4330 | 10 11 49.2 | 44.4 | 0.84 | 98367 |
| 30.5 | .9824201 | 4247 | .1701265 | 1080 | .0738286 | 8121 | 10 41 24.4 | 19.6 | 0.83 | 99007 |
| 31.0 | .9809325 | 9374 | .1779010 | 8834 | .0772027 | 1857 | 11 10 59.3 | 54.4 | 0.82 | 99647 |
| 31.5 | .9793720 | 3771 | .1856628 | 6441 | .0805712 | 5538 | 11 40 33.7 | 28.8 | 0.80 | ▣00285 |
| Apr. 1.0 | +.9777387 | 7440 | +.1934110 | 8922 | +.0839340 | 9162 | 12 10 7.7 | 2.7 | —0.76 | 000923 |

▣ The first figures of this and the following log. are 0.0.

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 0.0 |
| Apr. 1.5 | +.9760326 | 0382 | +.2011450 | 1261 | +.0872907 | 2724 | 12 39 41.1 | 36.0 | —0.72 | 001558 |
| 2.0 | .9742541 | 2600 | .2088643 | 8453 | .0906411 | 6223 | 13 9 14.2 | 9.1 | 0.68 | 02194 |
| 2.5 | .9724034 | 4095 | .2165682 | 5491 | .0939848 | 9656 | 13 38 46.7 | 41.5 | 0.64 | 02826 |
| 3.0 | .9704802 | 4866 | .2242564 | 2372 | .0973216 | 3020 | 14 8 18.9 | 13.7 | 0.59 | 03459 |
| 3.5 | .9684851 | 4918 | .2319281 | 9088 | .1006511 | 6310 | 14 37 50.5 | 45.2 | 0.53 | 04087 |
| 4.0 | +.9664183 | 4252 | +.2395827 | 5633 | +.1039733 | 9527 | 15 7 21.6 | 16.2 | —0.47 | 004715 |
| 4.5 | .9642798 | 2872 | .2472194 | 2000 | .1072878 | 2669 | 15 36 52.3 | 46.9 | 0.41 | 05341 |
| 5.0 | .9620700 | 0776 | .2548376 | 8181 | .1105944 | 5731 | 16 6 22.4 | 16.9 | 0.34 | 05966 |
| 5.5 | .9597887 | 7967 | .2624369 | 4174 | .1138927 | 8710 | 16 35 51.9 | 46.4 | 0.28 | 06587 |
| 6.0 | .9574364 | 4446 | .2700169 | :9973 | .1171827 | 1607 | 17 5 20.9 | 15.3 | 0.21 | 07207 |
| 6.5 | +.9550131 | 0215 | +.2775768 | 5572 | +.1204639 | 4415 | 17 34 49.5 | 43.8 | —0.15 | 007824 |
| 7.0 | .9525195 | 5283 | .2851161 | 0964 | .1237362 | 7135 | 18 4 17.5 | 11.8 | 0.08 | 08440 |
| 7.5 | .9499556 | 9647 | .2926342 | 6144 | .1269993 | 9762 | 18 33 44.9 | 39.1 | —0.02 | 09053 |
| 8.0 | .9473211 | 3305 | .3001304 | 1106 | .1302528 | 2293 | 19 3 11.8 | 6.0 | +0.04 | 09665 |
| 8.5 | .9446166 | 6263 | .3076041 | 5842 | .1334965 | 4726 | 19 32 38.2 | 32.3 | 0.09 | 10274 |
| 9.0 | +.9418429 | 8530 | +.3150543 | 0344 | +.1367302 | 7060 | 20 1 64.0 | 58.0 | +0.15 | 010882 |
| 9.5 | .9390003 | 0106 | .3224811 | 4612 | .1399536 | 9291 | 20 31 29.2 | 23.2 | 0.18 | 11486 |
| 10.0 | .9360885 | 0992 | .3298841 | 8641 | .1431666 | 1417 | 21 00 53.8 | 47.7 | 0.22 | 12088 |
| 10.5 | .9331081 | 1191 | .3372623 | 2422 | .1463689 | 3437 | 21 30 17.8 | 11.7 | 0.25 | 12689 |
| 11.0 | .9300593 | 0707 | .3446158 | 5958 | .1495603 | 5347 | 21 59 41.3 | 35.1 | 0.27 | 13288 |
| 11.5 | +.9269422 | 9540 | +.3519439 | 9239 | +.1527405 | 7145 | 22 28 64.2 | 57.8 | +0.29 | 013886 |
| 12.0 | .9237574 | 7695 | .3592457 | 2256 | .1559094 | 8831 | 22 58 26.6 | 20.3 | 0.30 | 14485 |
| 12.5 | .9205050 | 5175 | .3665210 | 5009 | .1590667 | 0402 | 23 27 48.4 | 43.0 | 0.30 | 15081 |
| 13.0 | .9171855 | 1984 | .3737686 | 7485 | .1622122 | 1854 | 23 57 9.6 | 3.2 | 0.31 | 15677 |
| 13.5 | .9137992 | 8125 | .3809886 | 9684 | .1653455 | 3184 | 24 26 30.2 | 23.7 | 0.29 | 16270 |
| 14.0 | +.9103466 | 3603 | +.3881802 | 1600 | +.1684666 | 4392 | 24 55 50.3 | 43.7 | +0.27 | 016864 |
| 14.5 | .9068275 | 8416 | .3953437 | 3235 | .1715753 | 5476 | 25 25 9.9 | 3.2 | 0.24 | 17456 |
| 15.0 | .9032424 | 2569 | .4024784 | 4581 | .1746714 | 6433 | 25 54 28.9 | 22.2 | 0.20 | 18049 |
| 15.5 | .8995917 | 6066 | .4095833 | 5630 | .1777548 | 7263 | 26 23 47.4 | 40.6 | 0.16 | 18639 |
| 16.0 | .8958755 | 8909 | .4166590 | 6383 | .1808250 | 7961 | 26 52 65.3 | 58.5 | 0.12 | 19230 |
| 16.5 | +.8920940 | 1099 | +.4237036 | 6832 | +.1838819 | 8527 | 27 22 22.7 | 15.8 | +0.07 | 019820 |
| 17.0 | .8882483 | 2646 | .4307174 | 6969 | .1869253 | 8958 | 27 51 39.6 | 32.6 | +0.01 | 20411 |
| 17.5 | .8843382 | 3549 | .4376995 | 6790 | .1899550 | 9251 | 28 20 55.9 | 48.9 | —0.05 | 21001 |
| 18.0 | .8803641 | 3813 | .4446499 | 6293 | .1929710 | 9408 | 28 50 11.7 | 4.6 | 0.11 | 21591 |
| 18.5 | .8763261 | 3438 | .4515676 | 5470 | .1959729 | 9423 | 29 19 27.0 | 19.9 | 0.18 | 22180 |
| 19.0 | +.8722245 | 2426 | +.4584529 | 4323 | +.1989607 | 9297 | 29 48 41.8 | 34.6 | —0.25 | 022770 |
| 19.5 | .8680598 | 0783 | .4653051 | 2846 | .2019340 | 9027 | 30 17 56.3 | 49.1 | 0.32 | 23357 |
| 20.0 | .8638525 | 8515 | .4721235 | 1030 | .2048927 | 8612 | 30 47 10.2 | 2.9 | 0.39 | 23945 |
| 20.5 | .8595427 | 5621 | .4789075 | 8871 | .2078366 | 8048 | 31 16 23.7 | 16.4 | 0.45 | 24532 |
| 21.0 | .8551904 | 2102 | .4856572 | 6369 | .2107655 | 7334 | 31 45 36.8 | 29.4 | 0.52 | 25120 |
| 21.5 | +.8507763 | 7965 | +.4923715 | 3512 | +.2136791 | 6467 | 32 14 49.3 | 41.8 | —0.57 | 025706 |
| 22.0 | .8463005 | 3212 | .4990506 | 0304 | .2165773 | 5446 | 32 43 61.4 | 53.9 | 0.63 | 26292 |
| 22.5 | .8417634 | 7845 | .5056935 | 6734 | .2194600 | 4271 | 33 13 13.0 | 5.4 | 0.69 | 26876 |
| 23.0 | .8371654 | 1869 | .5123003 | 2803 | .2223270 | 2938 | 33 42 24.2 | 16.6 | 0.74 | 27461 |
| 23.5 | .8325067 | 5286 | .5188699 | 8500 | .2251780 | 1445 | 34 11 35.0 | 27.3 | 0.77 | 28043 |
| 24.0 | +.8277867 | 8100 | +.5254027 | 3828 | +.2280129 | 9791 | 34 40 45.4 | 37.6 | —0.79 | 028626 |
| 24.5 | .8230086 | 0313 | .5318975 | 8776 | .2308315 | 7974 | 35 9 55.4 | 47.6 | 0.81 | 29206 |
| 25.0 | .8181699 | 1930 | .5383543 | 3345 | .2336335 | 5992 | 35 38 65.1 | 57.2 | 0.83 | 29786 |
| 25.5 | .8132718 | 2954 | .5447725 | 7527 | .2364188 | 3842 | 36 8 14.4 | 6.5 | 0.84 | 30363 |
| 26.0 | .8083145 | 3386 | .5511517 | 1319 | .2391872 | 1524 | 36 37 23.3 | 15.3 | 0.85 | 30939 |
| 26.5 | +.8032985 | 3231 | +.5574911 | 4713 | +.2419384 | 9035 | 37 6 31.8 | 23.7 | —0.84 | 031512 |
| 27.0 | .7982238 | 2488 | .5637906 | 7705 | .2446722 | 6369 | 37 35 40.0 | 31.9 | 0.83 | 32083 |
| 27.5 | .7930910 | 1165 | .5700491 | 0293 | .2473885 | 3529 | 38 4 47.8 | 39.6 | 0.82 | 32650 |
| 28.0 | .7879007 | 9267 | .5762669 | 2471 | .2500870 | 0511 | 38 33 55.2 | 46.9 | 0.78 | 33216 |
| 28.5 | .7826531 | 6796 | .5824430 | 4232 | .2527675 | 7313 | 39 2 62.2 | 53.8 | 0.74 | 33778 |
| 29.0 | +.7773487 | 3757 | +.5885773 | 5575 | +.2554299 | 3934 | 39 32 8.8 | 0.3 | —0.70 | 034338 |
| 29.5 | .7719879 | :0154 | .5946690 | 6492 | .2580739 | 0372 | 40 1 15.0 | 6.5 | 0.66 | 34892 |
| 30.0 | .7665708 | 5987 | .6007183 | 6987 | .2606993 | 6623 | 40 30 20.8 | 12.2 | 0.61 | 35444 |
| 30.5 | .7610978 | 1262 | .6067240 | 7044 | .2633060 | 2687 | 40 59 26.3 | 17.6 | 0.55 | 35992 |
| May 1.0 | .7555694 | 5983 | .6126861 | 6665 | .2658938 | 8562 | 41 28 31.5 | 22.7 | 0.49 | 36537 |
| 1.5 | +.7499860 | :0154 | +.6186038 | 5843 | +.2684623 | 4245 | 41 57 36.3 | 27.4 | —0.43 | 037077 |

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 0.0 |
| May 2.0 | +.7443483 | 3781 | +.6244770 | 4575 | +.2710115 | :9735 | 42 26 40.7 | 31.7 | —0.36 | 037613 |
| 2.5 | .7386566 | 6869 | .6303050 | 2856 | .2735411 | 5028 | 42 55 44.7 | 35.7 | 0.29 | 38145 |
| 3.0 | .7329112 | 9420 | .6360874 | 0680 | .2760510 | 0125 | 43 24 48.3 | 39.2 | 0.22 | 38674 |
| 3.5 | .7271127 | 1440 | .6418239 | 8046 | .2785408 | 5020 | 43 53 51.4 | 42.2 | 0.16 | 39197 |
| 4.0 | .7212616 | 2934 | .6475142 | 4949 | .2810105 | :9714 | 44 22 54.2 | 44.9 | 0.09 | 39717 |
| 4.5 | +.7153581 | 3905 | +.6531576 | 1384 | +.2834600 | 4207 | 44 51 56.5 | 47.2 | —0.03 | 040232 |
| 5.0 | .7094030 | 4360 | .6587535 | 7344 | .2858889 | 8494 | 45 20 58.5 | 49.1 | +0.03 | 40744 |
| 5.5 | .7033969 | 4305 | .6643018 | 2828 | .2882970 | 2573 | 45 49 60.0 | 50.5 | 0.09 | 41250 |
| 6.0 | .6973402 | 3744 | .6698017 | 7829 | .2906841 | 6442 | 46 18 61.1 | 51.5 | 0.14 | 41753 |
| 6.5 | .6912332 | 2681 | .6752532 | 2344 | .2930501 | 0100 | 46 47 61.6 | 51.9 | 0.18 | 42250 |
| 7.0 | +.6850760 | 1116 | +.6806557 | 6370 | +.2953949 | 3546 | 47 16 61.8 | 52.0 | +0.22 | 042743 |
| 7.5 | .6788695 | 9057 | .6860090 | :9904 | .2977183 | 6778 | 47 45 61.5 | 51.6 | 0.24 | 43230 |
| 8.0 | .6726143 | 6511 | .6913125 | 2940 | .3000201 | 9794 | 48 14 60.8 | 50.8 | 0.26 | 43714 |
| 8.5 | .6663108 | 3482 | .6965662 | 5478 | .3023001 | 2592 | 48 43 59.6 | 49.5 | 0.28 | 44192 |
| 9.0 | .6599596 | 9977 | .7017692 | 7509 | .3045584 | 5173 | 49 12 58.0 | 47.9 | 0.30 | 44665 |
| 9.5 | +.6535611 | 5998 | +.7069219 | 9038 | +.3067945 | 7533 | 49 41 56.0 | 45.8 | +0.30 | 045135 |
| 10.0 | .6471160 | 1553 | .7120237 | 0057 | .3090086 | 9673 | 50 10 53.6 | 43.3 | 0.31 | 45602 |
| 10.5 | .6406247 | 6646 | .7170741 | 0563 | .3112004 | 1590 | 50 39 50.6 | 40.3 | 0.30 | 46065 |
| 11.0 | .6340877 | 1281 | .7220731 | 0554 | .3133697 | 3282 | 51 8 47.3 | 36.9 | 0.29 | 46525 |
| 11.5 | .6275058 | 5466 | .7270199 | 0024 | .3155162 | 4746 | 51 37 43.4 | 42.9 | 0.26 | 46981 |
| 12.0 | +.6208793 | 9207 | +.7319143 | 8967 | +.3176402 | 5985 | 52 6 39.2 | 28.7 | +0.23 | 047434 |
| 12.5 | .6142085 | 2505 | .7367562 | 7390 | .3197414 | 6996 | 52 35 34.4 | 23.8 | 0.19 | 47882 |
| 13.0 | .6074941 | 5366 | .7415452 | 5282 | .3218193 | 7774 | 53 4 29.3 | 18.6 | 0.14 | 48328 |
| 13.5 | .6007367 | 7797 | .7462811 | 2642 | .3238744 | 8324 | 53 33 23.6 | 22.8 | 0.09 | 48770 |
| 14.0 | .5939370 | 9807 | .7509634 | 9467 | .3259061 | 8640 | 54 2 17.6 | 6.7 | +0.04 | 49211 |
| 14.5 | +.5870949 | 1391 | +.7555921 | 5756 | +.3279145 | 8724 | 54 31 11.1 | 0.2 | —0.02 | 049647 |
| 15.0 | .5802113 | 2560 | .7601666 | 1504 | .3298994 | 8572 | 54 59 64.3 | 53.3 | 0.09 | 50082 |
| 15.5 | .5732867 | 3320 | .7646870 | 6710 | .3318606 | 8184 | 55 28 57.0 | 45.9 | 0.15 | 50513 |
| 16.0 | .5663216 | 3675 | .7691529 | 1372 | .3337984 | 7561 | 55 57 49.4 | 38.2 | 0.22 | 50943 |
| 16.5 | .5593164 | 3629 | .7735639 | 5484 | .3357123 | 6699 | 56 26 41.3 | 30.0 | 0.28 | 51371 |
| 17.0 | +.5522715 | 3186 | +.7779200 | 9047 | +.3376024 | 5600 | 56 55 32.9 | 21.6 | —0.35 | 051794 |
| 17.5 | .5451875 | 2351 | .7822208 | 2057 | .3394685 | 4260 | 57 24 24.1 | 12.7 | 0.41 | 52215 |
| 18.0 | .5380652 | 1133 | .7864660 | 4511 | .3413104 | 2679 | 57 53 14.9 | 3.4 | 0.48 | 52634 |
| 18.5 | .5309047 | 9534 | .7906552 | 6405 | .3431281 | 0855 | 58 21 65.4 | 53.8 | 0.53 | 53050 |
| 19.0 | .5237067 | 7560 | .7947883 | 7739 | .3449214 | 8787 | 58 50 55.5 | 43.8 | 0.59 | 53465 |
| 19.5 | +.5164715 | 5214 | +.7988649 | 8508 | +.3466902 | 6475 | 59 19 45.3 | 33.6 | —0.64 | 053876 |
| 20.0 | .5091996 | 2501 | .8028849 | 8710 | .3484347 | 3919 | 59 48 34.7 | 22 9 | 0.69 | 54285 |
| 20.5 | .5018914 | 9425 | .8068480 | 8344 | .3501546 | 1118 | 60 17 23.9 | 12.0 | 0.73 | 54691 |
| 21.0 | .4945476 | 5993 | .8107542 | 7408 | .3518498 | 8069 | 60 46 12.8 | 0.8 | 0.77 | 55096 |
| 21.5 | .4871686 | 2210 | .8146030 | 5899 | .3535200 | 4771 | 61 14 61.5 | 59.4 | 0.79 | 55497 |
| 22.0 | +.4797550 | 8080 | +.8183943 | 3815 | +.3551652 | 1222 | 61 43 49.8 | 37.6 | —0.81 | 055896 |
| 22.5 | .4723072 | 3608 | .8221277 | 1151 | .3567852 | 7421 | 62 12 37.8 | 25.5 | 0.82 | 56293 |
| 23.0 | .4648255 | 8798 | .8258029 | 7906 | .3583802 | 3371 | 62 41 25.6 | 13.2 | 0.83 | 56686 |
| 23.5 | .4573102 | 3651 | .8294197 | 4076 | .3599498 | 9067 | 63 10 13.2 | 0.7 | 0.82 | 57076 |
| 24.0 | .4497620 | 8176 | .8329779 | 9661 | .3614940 | 4509 | 63 38 60.6 | 48.0 | 0.81 | 57462 |
| 24.5 | +.4421819 | 2381 | +.8364772 | 4657 | +.3630126 | :9694 | 64 7 47.7 | 35.1 | —0.79 | 057845 |
| 25.0 | .4345701 | 6268 | .8399173 | 9062 | .3645057 | 4625 | 64 36 34.7 | 22.0 | 0.76 | 58224 |
| 25.5 | .4269273 | 9845 | .8432980 | 2872 | .3659729 | 9296 | 65 5 21.4 | 8.6 | 0.73 | 58599 |
| 26.0 | .4192538 | 3116 | .8466189 | 6084 | .3674144 | 3710 | 65 33 67.9 | 55.0 | 0.69 | 58971 |
| 26.5 | .4115502 | 6086 | .8498798 | 8697 | .3688298 | 7864 | 66 2 54.1 | 41.1 | 0.66 | 59338 |
| 27.0 | +.4038170 | 8759 | +.8530802 | 0705 | +.3702190 | 1755 | 66 31 40.2 | 27.2 | —0.62 | 059701 |
| 27.5 | .3960547 | 1142 | .8562203 | 2109 | .3715820 | 5385 | 67 0 26.0 | 12.9 | 0.56 | 60059 |
| 28.0 | .3882639 | 3239 | .8592996 | 2906 | .3729186 | 8750 | 67 28 71.6 | 58.4 | 0.49 | 60413 |
| 28.5 | .3804451 | 5057 | .8623178 | 3091 | .3742287 | 1850 | 67 57 57.0 | 43.7 | 0.43 | 66760 |
| 29.0 | .3725989 | 6601 | .8652748 | 2664 | .3755124 | 4686 | 68 26 42.2 | 28.8 | 0.36 | 61104 |
| 29.5 | +.3647258 | 7876 | +.8681707 | 1625 | +.3767694 | 7258 | 68 55 27.2 | 13.8 | —0.29 | 061442 |
| 30.0 | .3568265 | 8889 | .8710044 | :9968 | .3779997 | 9563 | 69 23 72.1 | 58.6 | 0.22 | 61775 |
| 30.5 | .3489015 | 9645 | .8737764 | 7692 | .3792031 | 1599 | 69 52 56.7 | 43.1 | 0.15 | 62102 |
| 31.0 | .3409515 | :0151 | .8764864 | 4796 | .3803795 | 3365 | 70 21 41.1 | 27.4 | 0.08 | 62423 |
| 31.5 | .3329769 | :0411 | .8791341 | 1278 | .3815288 | 4859 | 70 50 25.3 | 11.5 | —0.02 | 62739 |
| June 1.0 | +.3249785 | :0432 | +.8817192 | 7133 | +.3826510 | 6083 | 71 18 69.4 | 55.5 | +0.04 | 063049 |

| Date. 1856. | RECTANGULAR EQUATORIAL | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X'. | Y. | Y'. | Z. | Z'. | λ = ☉'s True Longitude. | λ' | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 0.0 |
| June 1.5 | +.3169566 | :0220 | +.8842418 | 2363 | +.3837459 | 7034 | 71 47 53.2 | 39.2 | +0.10 | 063352 |
| 2.0 | .3089120 | 9780 | .8867010 | 6959 | .3848134 | 7711 | 72 16 36.8 | 22.7 | 0.16 | 63650 |
| 2.5 | .3008456 | 9122 | .8890973 | 0926 | .3858535 | 8114 | 72 45 20.1 | 5.9 | 0.21 | 63942 |
| 3.0 | .2927576 | 8248 | .8914303 | 4260 | .3868663 | 8243 | 73 13 63.3 | 49.0 | 0.25 | 64228 |
| 3.5 | .2846491 | 7169 | .8936999 | 6961 | .3878516 | 8097 | 73 42 46.1 | 31.7 | 0.28 | 64508 |
| 4.0 | +.2765202 | 5886 | +.8959060 | 9027 | +.3888091 | 7673 | 74 11 28.8 | 14.3 | +0.30 | 064782 |
| 4.5 | .2683719 | 4410 | .8980483 | 0455 | .3897388 | 6972 | 74 39 71.2 | 56.6 | 0.32 | 65049 |
| 5.0 | .2602045 | 2743 | .9001266 | 1242 | .3906408 | 5994 | 75 8 53.4 | 38.7 | 0.34 | 65311 |
| 5.5 | .2520188 | 0893 | .9021409 | 1390 | .3915149 | 4736 | 75 37 35.2 | 20.4 | 0.35 | 65566 |
| 6.0 | .2438155 | 8866 | .9040911 | 0897 | .3923613 | 3201 | 76 6 16.9 | 2.0 | 0.36 | 65816 |
| 6.5 | +.2355954 | 6672 | +.9059771 | 9762 | +.3931797 | 1386 | 76 34 38.2 | 43.2 | +0.35 | 066060 |
| 7.0 | .2273588 | 4313 | .9077988 | 7984 | .3939702 | 9293 | 77 3 39.4 | 24.3 | 0.34 | 66298 |
| 7.5 | .2191063 | 1794 | .9095559 | 5559 | .3947326 | 6918 | 77 32 20.2 | 5.0 | 0.32 | 66530 |
| 8.0 | .2108387 | 9124 | .9112487 | 2492 | .3954670 | 4263 | 78 0 60.9 | 45.6 | 0.30 | 66756 |
| 8.5 | .2025565 | 6307 | .9128767 | 8777 | .3961732 | 1327 | 78 29 41.2 | 25.9 | 0.28 | 66977 |
| 9.0 | +.1942602 | 3350 | +.9144393 | 4408 | +.3968514 | 8111 | 78 58 21.4 | 6.0 | +0.24 | 067193 |
| 9.5 | .1859506 | :0259 | .9159378 | 9398 | .3975015 | 4615 | 79 26 61.3 | 45.8 | 0.19 | 67403 |
| 10.0 | .1776282 | 7041 | .9173721 | 3746 | .3981235 | 0837 | 79 55 41.0 | 25.4 | 0.12 | 67609 |
| 10.5 | .1692938 | 3703 | .9187409 | 7439 | .3987173 | 6777 | 80 24 20.4 | 4.7 | +0.05 | 67809 |
| 11.0 | .1609476 | 0246 | .9200450 | 0485 | .3992829 | 2435 | 80 52 59.7 | 43.9 | —0.02 | 68005 |
| 11.5 | +.1525904 | 6679 | +.9212841 | 2881 | +.3998204 | 7812 | 81 21 38.6 | 22.7 | —0.09 | 068196 |
| 12.0 | .1442230 | 3011 | .9224586 | 4631 | .4003297 | 2907 | 81 50 17.4 | 1.4 | 0.16 | 68384 |
| 12.5 | .1358456 | 9243 | .9235679 | 5729 | .4008107 | 7719 | 82 18 55.9 | 39.8 | 0.22 | 68567 |
| 13.0 | .1274591 | 5384 | .9246125 | 6180 | .4012636 | 2250 | 82 47 34.2 | 13.0 | 0.29 | 68746 |
| 13.5 | .1190638 | 1436 | .9255918 | 5979 | .4016882 | 6498 | 83 15 72.3 | 56.0 | 0.35 | 68921 |
| 14.0 | +.1106607 | 7410 | +.9265060 | 5127 | +.4020847 | 0465 | 83 44 50.3 | 33.9 | —0.42 | 069092 |
| 14.5 | .1022502 | 3310 | .9273552 | 3628 | .4024528 | 4148 | 84 13 28.0 | 11.5 | 0.47 | 69259 |
| 15.0 | .0938328 | 9141 | .9281388 | 1467 | .4027928 | 7550 | 84 41 65.5 | 48.9 | 0.52 | 69423 |
| 15.5 | .0854090 | 4909 | .9288577 | 8662 | .4031046 | 0670 | 85 10 42.8 | 26.1 | 0.57 | 69583 |
| 16.0 | .0769794 | :0618 | .9295112 | 5203 | .4033881 | 3507 | 85 39 19.9 | 3.1 | 0.62 | 69740 |
| 16.5 | +.0685445 | 6274 | +.9300996 | 1093 | +.4036432 | 6060 | 86 7 56.9 | 40.0 | —0.66 | 069893 |
| 17.0 | .0601050 | 1885 | .9306232 | 6335 | .4038701 | 8331 | 86 36 33.8 | 16.8 | 0.70 | 70043 |
| 17.5 | .0516614 | 7454 | .9310814 | 0923 | .4040686 | 0319 | 87 4 70.6 | 53.5 | 0.73 | 70189 |
| 18.0 | .0432141 | 2987 | .9314741 | 4856 | .4042390 | 2025 | 87 33 47.1 | 29.9 | 0.77 | 70332 |
| 18.5 | .0347634 | 8485 | .9318114 | 8135 | .4043811 | 3449 | 88 2 23.6 | 6.3 | 0.78 | 70471 |
| 19.0 | +.0263102 | 3956 | +.9320636 | 0764 | +.4044948 | 4589 | 88 30 60.2 | 42.8 | —0.79 | 070606 |
| 19.5 | .0178549 | 9408 | .9322603 | 2737 | .4045803 | 5446 | 88 59 36.6 | 19.1 | 0.79 | 70737 |
| 20.0 | +.0093983 | 4847 | .9323917 | 4057 | .4046372 | 6018 | 89 27 73.0 | 55.4 | 0.80 | 70864 |
| 20.5 | —.0009409 | :0277 | .9324577 | 4723 | .4046660 | 6508 | 89 56 49.3 | 31.6 | 0.78 | 70988 |
| 21.0 | .0075170 | 4296 | .9324583 | 4736 | .4046664 | 6315 | 90 25 25.6 | 7.8 | 0.75 | 71108 |
| 21.5 | —.0159749 | 8871 | +.9323935 | 4095 | +.4046385 | 6039 | 90 53 61.8 | 43.9 | —0.72 | 071224 |
| 22.0 | .0244319 | 3436 | .9322633 | 2800 | .4045821 | 5478 | 91 22 38.0 | 20.0 | 0.68 | 71336 |
| 22.5 | .0328874 | 7987 | .9320677 | 0849 | .4044974 | 4634 | 91 50 74.1 | 56.0 | 0.64 | 71443 |
| 23.0 | .0413407 | 2515 | .9318066 | 8245 | .4043843 | 3505 | 92 19 50.3 | 32.1 | 0.59 | 71547 |
| 23.5 | .0497916 | 7020 | .9314800 | 4986 | .4042428 | 2093 | 92 48 26.4 | 8.1 | 0.54 | 71645 |
| 24.0 | —.0582393 | 1492 | +.9310879 | 1073 | +.4040729 | 0397 | 93 16 62.6 | 44.2 | —0.48 | 071740 |
| 24.5 | .0666835 | 5931 | .9306300 | 6501 | .4038746 | 8418 | 93 45 38.7 | 20.2 | 0.41 | 71828 |
| 25.0 | .0751233 | 0324 | .9301067 | 1275 | .4036479 | 6154 | 94 13 74.9 | 56.3 | 0.35 | 71913 |
| 25.5 | .0835583 | 4670 | .9295179 | 5396 | .4033927 | 3606 | 94 42 51.1 | 32.4 | 0.21 | 71992 |
| 26.0 | .0919887 | 8961 | .9288636 | 8860 | .4031091 | 0773 | 95 11 27.4 | 8.6 | 0.18 | 72065 |
| 26.5 | —.1004112 | 3191 | +.9281438 | 1669 | +.4027970 | 7656 | 95 39 63.6 | 44.7 | —0.13 | 072133 |
| 27.0 | .1088279 | 7354 | .9273583 | 3821 | .4024564 | 4254 | 96 8 39.8 | 20.8 | —0.06 | 72196 |
| 27.5 | .1172372 | 1443 | .9265074 | 5320 | .4020873 | 0567 | 96 36 76.1 | 57.0 | 0.00 | 72252 |
| 28.0 | .1256385 | 5451 | .9255909 | 6162 | .4016900 | 6598 | 97 5 52.5 | 33.3 | +0.06 | 72303 |
| 28.5 | .1340316 | :9377 | .9246092 | 6352 | .4012644 | 2346 | 97 34 28.8 | 9.6 | 0.12 | 72347 |
| 29.0 | —.1424154 | 3215 | +.9235622 | 5890 | +.4008104 | 7810 | 98 2 65.2 | 45.9 | +0.19 | 072386 |
| 29.5 | .1507895 | 6951 | .9224500 | 4776 | .4003281 | 2990 | 98 31 41.6 | 22.2 | 0.24 | 72418 |
| 30.0 | .1591531 | 0584 | .9212725 | 3009 | .3998174 | 7887 | 98 59 78.0 | 58.5 | 0.29 | 72444 |
| 30.5 | .1675057 | 4107 | .9200298 | 0590 | .3992783 | 2499 | 99 28 54.5 | 34.9 | 0.32 | 72463 |
| July 1.0 | .1758464 | 7510 | .9187220 | 7520 | .3987109 | 6829 | 99 57 31.0 | 11.3 | 0.35 | 72477 |
| 1.5 | —.1841748 | 0790 | +.9173490 | 3798 | +.3981153 | 0877 | 100 25 67.5 | 47.7 | +0.37 | 072482 |

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X'. | Y. | Y'. | Z. | Z'. | λ = ☉'s True Longitude. | λ' | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 0.0 |
| July 2.0 | —.1924901 | 3939 | +.9159111 | 9427 | +.3974913 | 4641 | 100 54 44.0 | 24.1 | +0.40 | 072482 |
| 2.5 | .2007918 | 6953 | .9144081 | 4405 | .3968391 | 8123 | 101 23 20.4 | 0.4 | 0.41 | 72474 |
| 3.0 | .2090791 | :9823 | .9128407 | 8739 | .3961588 | 1323 | 101 51 56.9 | 36.8 | 0.42 | 72460 |
| 3.5 | .2173518 | 2548 | .9112088 | 2428 | .3954506 | 4245 | 102 20 33.4 | 13.3 | 0.41 | 72440 |
| 4.0 | .2256090 | 5118 | .9095123 | 5472 | .3947143 | 6886 | 102 48 69.9 | 49.7 | 0.40 | 72413 |
| 4.5 | —.2338502 | 7528 | +.9077514 | 7871 | +.3939501 | 9248 | 103 17 46.3 | 26.0 | +0.38 | 072380 |
| 5.0 | .2420745 | :9769 | .9059266 | 9631 | .3931580 | 1331 | 103 46 22.8 | 2.4 | 0.36 | 72341 |
| 5.5 | .2502814 | 1836 | .9040377 | 0751 | .3923381 | 3136 | 104 14 59.3 | 38.8 | 0.33 | 72294 |
| 6.0 | .2584702 | 3722 | .9020851 | 1233 | .3914906 | 4665 | 104 43 35.8 | 15.2 | 0.29 | 72240 |
| 6.5 | .2666405 | 5423 | .9000689 | 1079 | .3906153 | 5916 | 105 11 72.2 | 51.5 | 0.24 | 72182 |
| 7.0 | —.2747916 | 6932 | +.8979890 | :0289 | +.3897125 | 6892 | 105 40 48.6 | 27.8 | +0.19 | 072117 |
| 7.5 | .2829231 | 8245 | .8958458 | 8865 | .3887823 | 7594 | 106 9 25.0 | 4.1 | 0.14 | 72047 |
| 8.0 | .2910343 | :9354 | .8936394 | 6810 | .3878244 | 8019 | 106 37 61.3 | 40.3 | 0.09 | 71970 |
| 8.5 | .2991246 | 0256 | .8713701 | 4125 | .3868394 | 8174 | 107 6 37.6 | 16.5 | +0.03 | 71888 |
| 9.0 | .3071934 | 0943 | .8890382 | 0815 | .3858269 | 8054 | 107 34 74.0 | 52.8 | —0.04 | 71800 |
| 9.5 | —.3152402 | 1410 | +.8866437 | 6879 | +.3847873 | 7663 | 108 3 50.3 | 29.0 | —0.11 | 071707 |
| 10.0 | .3232642 | 1649 | .8841870 | 2321 | .3837209 | 7003 | 108 32 26.6 | 5.2 | 0.18 | 71609 |
| 10.5 | .3312652 | 1658 | .8816683 | 7143 | .3826276 | 6074 | 109 0 62.9 | 41.4 | 0.24 | 71506 |
| 11.0 | .3392425 | 1430 | .8790875 | 1344 | .3815073 | 4876 | 109 29 39.2 | 17.6 | 0.30 | 71399 |
| 11.5 | .3471958 | 0962 | .8764449 | 4926 | .3803603 | 3410 | 109 57 75.5 | 53.9 | 0.36 | 71287 |
| 12.0 | —.3551244 | 0247 | +.8737409 | 7895 | +.3791864 | 1675 | 110 26 51.9 | 30.2 | —0.42 | 071170 |
| 12.5 | .3630278 | :9278 | .8709756 | :0251 | .3779861 | 9676 | 110 53 28.3 | 6.5 | 0.47 | 71049 |
| 13.0 | .3709053 | 8053 | .8681491 | 1995 | .3767592 | 7412 | 111 23 64.8 | 42.9 | 0.53 | 70923 |
| 13.5 | .3787564 | 6563 | .8652621 | 3133 | .3755060 | 4885 | 111 52 41.2 | 19.2 | 0.57 | 70794 |
| 14.0 | .3865805 | 4804 | .8623144 | 3665 | .3742266 | 2096 | 112 20 77.6 | 55.5 | 0.61 | 70660 |
| 14.5 | —.3943772 | 2770 | +.8593064 | 3593 | +.3729212 | 9047 | 112 49 54.1 | 32.0 | —0.63 | 070524 |
| 15.0 | .4021459 | 0456 | .8562383 | 2920 | .3715895 | 5736 | 113 18 30.7 | 8.5 | 0.66 | 70383 |
| 15.5 | .4098863 | 7859 | .8531103 | 1649 | .3702318 | 2164 | 113 46 67.3 | 45.0 | 0.67 | 70239 |
| 16.0 | .4175979 | 4974 | .8499225 | 9780 | .3688483 | 8334 | 114 15 43.9 | 21.5 | 0.69 | 70091 |
| 16.5 | .4252804 | 1799 | .8466751 | 7314 | .3674391 | 4248 | 114 43 80.9 | 58.4 | 0.69 | 69940 |
| 17.0 | —.4329331 | 8325 | +.8433683 | 4255 | +.3660040 | :9903 | 115 12 57.7 | 35.1 | —0.69 | 069785 |
| 17.5 | .4405556 | 4549 | .8400024 | 0604 | .3645432 | 5301 | 115 41 34.9 | 12.2 | 0.67 | 69627 |
| 18.0 | .4481471 | 0463 | .8365774 | 6362 | .3630570 | 0445 | 116 9 72.0 | 49.2 | 0.65 | 69464 |
| 18.5 | .4557074 | 6066 | .8330935 | 1533 | .3615454 | 5334 | 116 38 49.5 | 26.6 | 0.61 | 69299 |
| 19.0 | .4632358 | 1351 | .8295513 | 6120 | .3600084 | :9969 | 117 7 27.1 | 4.1 | 0.57 | 69129 |
| 19.5 | —.4707319 | 6312 | +.8259509 | :0125 | +.3584460 | 4350 | 117 35 64.8 | 41.7 | —0.54 | 068957 |
| 20.0 | .4781950 | 0944 | .8222924 | 3550 | .3568586 | 8481 | 118 4 42.7 | 19.5 | 0.50 | 68781 |
| 20.5 | .4856247 | 5241 | .8185760 | 6396 | .3552460 | 2360 | 118 32 80.8 | 57.5 | 0.45 | 68602 |
| 21.0 | .4930205 | :9199 | .8148020 | 8665 | .3536086 | 5991 | 119 1 59.1 | 35.8 | 0.40 | 68418 |
| 21.5 | .5003818 | 2813 | .8109706 | :0361 | .3519462 | 9372 | 119 30 37.5 | 14.1 | 0.33 | 68231 |
| 22.0 | —.5077081 | 6076 | +.8070820 | 1484 | +.3502590 | 2506 | 119 58 76.2 | 52.7 | —0.26 | 068040 |
| 22.5 | .5149990 | 8986 | .8031362 | 2036 | .3485471 | 5392 | 120 27 55.1 | 31.5 | 0.20 | 67844 |
| 23.0 | .5222541 | 1537 | .7991338 | 2021 | .3468104 | 8031 | 120 56 34.3 | 10.6 | 0.13 | 67643 |
| 23.5 | .5294730 | 3728 | .7950748 | 1440 | .3450492 | 0424 | 121 24 73.8 | 50.0 | —0.07 | 67438 |
| 24.0 | .5366550 | 5550 | .7909595 | :0295 | .3432636 | 2573 | 121 53 53.5 | 29.6 | 0.00 | 67229 |
| 24.5 | —.5437995 | 6998 | +.7867882 | 8590 | +.3414539 | 4482 | 122 22 33.5 | 9.5 | +0.06 | 067016 |
| 25.0 | .5509058 | 8064 | .7825610 | 6327 | .3396200 | 6148 | 122 50 73.7 | 49.6 | 0.13 | 66797 |
| 25.5 | .5579734 | 8742 | .7782783 | 3509 | .3377616 | 7570 | 122 19 54.2 | 30.0 | 0.19 | 66574 |
| 26.0 | .5650019 | :9029 | .7739403 | :0137 | .3358792 | 8751 | 123 48 34.9 | 10.7 | 0.26 | 66345 |
| 26.5 | .5719907 | 8919 | .7695472 | 6215 | .3339730 | 9695 | 124 16 75.9 | 51.6 | 0.31 | 66111 |
| 27.0 | —.5789391 | 8406 | +.7650594 | 1746 | +.3320430 | 0401 | 124 45 57.1 | 32.7 | +0.36 | 065871 |
| 27.5 | .5858467 | 7484 | .7605971 | 6732 | .3300894 | 0870 | 125 14 38.7 | 14.2 | 0.40 | 65625 |
| 28.0 | .5927131 | 6151 | .7560407 | 1177 | .3281122 | 1104 | 125 42 80.5 | 55.9 | 0.44 | 65373 |
| 28.5 | .5995379 | 4400 | .7514303 | 5082 | .3261116 | 1104 | 126 11 62.5 | 37.8 | 0.49 | 65116 |
| 29.0 | .6063199 | 2225 | .7467667 | 8455 | .3240878 | 0871 | 126 40 44.8 | 20.0 | 0.50 | 64853 |
| 29.5 | —.6130591 | :9620 | +.7420498 | 1295 | +.3220410 | 0408 | 127 9 27.4 | 2.6 | +0.51 | 064585 |
| 30.0 | .6197547 | 6579 | .7372803 | 3609 | .3199712 | 9716 | 127 37 70.2 | 45.3 | 0.52 | 64311 |
| 30.5 | .6264062 | 3097 | .7324584 | 5399 | .3178787 | 8797 | 128 6 53.2 | 28.2 | 0.52 | 64031 |
| 31.0 | .6330132 | :9170 | .7275844 | 6668 | .3157634 | 7650 | 128 35 36.4 | 11.3 | 0.51 | 63745 |
| 31.5 | .6395757 | 4798 | .7226585 | 7418 | .3136256 | 6277 | 129 3 79.9 | 54.8 | 0.50 | 63453 |
| Aug. 1.0 | —.6460925 | :9970 | +.7176882 | 7654 | +.3114653 | 4680 | 129 32 63.6 | 38.4 | +0.48 | 063154 |

| Date. 1856. | RECTANGULAR EQUATORIAL. |  |  |  |  |  | POLAR ECLIPTIC. |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
|  |  |  |  |  |  |  | ° ′ ″ | ″ | ″ | 0.0 |
| Aug. 1.5 | —.6525629 | 4677 | +.7126524 | 7375 | +.3092829 | 2862 | 130 1 47.6 | 22.3 | +0.44 | 062850 |
| 2.0 | .6589867 | 8918 | .7075728 | 6588 | .3070783 | 0822 | 130 30 31.8 | 6.4 | 0.40 | 62539 |
| 2.5 | .6653639 | 2694 | .7024429 | 5298 | .3048517 | 8562 | 130 58 76.3 | 50.8 | 0.36 | 62223 |
| 3.0 | .6716936 | 5995 | .6972631 | 3508 | .3026034 | 6086 | 131 27 61.6 | 36.0 | 0.31 | 61900 |
| 3.5 | .6779753 | 8817 | .6920338 | 1224 | .3003338 | 3396 | 131 56 46.5 | 20.9 | 0.26 | 61573 |
| 4.0 | —.6842085 | 1155 | +.6867555 | 8450 | +.2980429 | 0493 | 132 25 31.0 | 5.3 | +0.21 | 061239 |
| 4.5 | .6903924 | 2997 | .6864282 | 5186 | .2957306 | 7376 | 132 53 76.4 | 50.6 | 0.15 | 60900 |
| 5.0 | .6965269 | 4347 | .6760526 | 1439 | .2933974 | 4051 | 133 22 62.0 | 36.1 | 0.08 | 60554 |
| 5.5 | .7026116 | 5199 | .6706289 | 7211 | .2910434 | 0517 | 133 51 47.7 | 21.8 | +0.02 | 60198 |
| 6.0 | .7086461 | 5548 | .6651580 | 2511 | .2886687 | 6776 | 134 20 33.6 | 7.6 | —0.04 | 59847 |
| 6.5 | —.7146299 | 5391 | +.6596401 | 7341 | +.2862737 | 2832 | 134 48 79.7 | 53.6 | —0.10 | 059487 |
| 7.0 | .7205626 | 4722 | .6540757 | 1706 | .2838584 | 8685 | 135 17 66.1 | 39.9 | 0.17 | 59121 |
| 7.5 | .7264438 | 3540 | .6484650 | 5607 | .2814229 | 4336 | 135 46 52.6 | 26.4 | 0.23 | 58752 |
| 8.0 | .7322731 | 1839 | .6428082 | 9047 | .2789679 | 9791 | 136 15 39.3 | 13.0 | 0.29 | 58378 |
| 8.5 | .7380503 | :9617 | .6371059 | 2032 | .2764931 | 5049 | 136 43 86.2 | 59.8 | 0.34 | 58000 |
| 9.0 | —.7437748 | 6868 | +.6313585 | 4566 | +.2739986 | :0110 | 137 13 13.6 | 47.1 | —0.39 | 057617 |
| 9.5 | .7494461 | 3587 | .6255665 | 6654 | .2714847 | 4977 | 137 41 61.4 | 34.8 | 0.43 | 57230 |
| 10.0 | .7550638 | :9770 | .6197305 | 8301 | .2689518 | 9653 | 138 10 49.7 | 23.1 | 0.47 | 56840 |
| 10.5 | .7606275 | 5413 | .6138507 | 9511 | .2664001 | 4142 | 138 39 37.5 | 10.8 | 0.50 | 56446 |
| 11.0 | .7661370 | 0514 | .6079277 | 0282 | .2638295 | 8442 | 139 7 85.8 | 59.0 | 0.53 | 56050 |
| 11.5 | —.7715920 | 5070 | +.6019618 | :0638 | +.2612404 | 2557 | 139 36 73.6 | 46.7 | —0.55 | 055650 |
| 12.0 | .7769920 | 9076 | .5959535 | :0563 | .2586328 | 6487 | 140 5 61.9 | 35.0 | 0.57 | 55247 |
| 12.5 | .7823361 | 2530 | .5899030 | :0065 | .2560070 | 0235 | 140 34 50.7 | 23.7 | 0.58 | 54841 |
| 13.0 | .7876262 | 5428 | .5838109 | 9152 | .2533631 | 3801 | 141 3 40.0 | 13.0 | 0.59 | 54432 |
| 13.5 | .7928595 | 7767 | .5776773 | 7823 | .2507013 | 7189 | 141 32 29.4 | 2.3 | 0.61 | 54020 |
| 14.0 | —.7980367 | :9544 | +.5715030 | 6088 | +.2480219 | 0400 | 142 0 79.3 | 52.1 | —0.60 | 053605 |
| 14.5 | .8031571 | 0754 | .5652886 | 3952 | .2453251 | 8438 | 142 29 69.3 | 42.0 | 0.56 | 53189 |
| 15.0 | .8082203 | 1392 | .5590342 | 1415 | .2426109 | 6302 | 142 58 59.7 | 32.4 | 0.51 | 52770 |
| 15.5 | .8132265 | 1460 | .5527402 | 8483 | .2398796 | 8996 | 143 27 50.3 | 22.9 | 0.47 | 52350 |
| 16.0 | .8181749 | 0950 | .5464069 | 5158 | .2371313 | 1519 | 143 56 41.4 | 13.9 | 0.42 | 51927 |
| 16.5 | —.8230654 | :9861 | +.5400350 | 1447 | +.2343662 | 3874 | 144 25 32.7 | 5.1 | —0.37 | 051502 |
| 17.0 | .8278973 | 8187 | .5336244 | 7349 | .2315844 | 6062 | 144 53 84.5 | 56.9 | 0.31 | 51074 |
| 17.5 | .8326703 | 5925 | .5271756 | 2868 | .2287863 | 8086 | 145 22 76.6 | 49.0 | 0.25 | 50643 |
| 18.0 | .8373842 | 3072 | .5206891 | 8010 | .2259717 | 9946 | 145 51 69.1 | 41.4 | 0.18 | 50210 |
| 18.5 | .8420388 | :9626 | .5141655 | 2781 | .2231409 | 1643 | 146 20 62.0 | 34.2 | 0.12 | 49774 |
| 19.0 | —.8466335 | 5581 | +.5076051 | 7184 | +.2202941 | 3181 | 146 49 55.3 | 27.5 | —0.05 | 049336 |
| 19.5 | .8511682 | 0936 | .5010082 | 1221 | .2174315 | 4560 | 147 18 49.0 | 21.1 | +0.02 | 48895 |
| 20.0 | .8556424 | 5688 | .4943755 | 4901 | .2145533 | 5784 | 147 47 43.2 | 15.3 | 0.09 | 48452 |
| 20.5 | .8600559 | :9833 | .4877072 | 8224 | .2116598 | 6854 | 148 16 37.8 | 9.8 | 0.15 | 48006 |
| 21.0 | .8644080 | 3364 | .4810038 | 1197 | .2087510 | 7771 | 148 45 32.8 | 4.7 | 0.21 | 47557 |
| 21.5 | —.8686986 | 6279 | +.4742659 | 3825 | +.2058272 | 8539 | 149 14 28.2 | 0.0 | +0.27 | 047105 |
| 22.0 | .8729274 | 8576 | .4674938 | 6111 | .2028885 | 9157 | 149 42 84.1 | 55.9 | 0.34 | 46651 |
| 22.5 | .8770939 | 0251 | .4606878 | 8058 | .1999351 | 9629 | 150 11 80.4 | 52.2 | 0.39 | 46194 |
| 23.0 | .8811979 | 1301 | .4538485 | 9671 | .1969672 | 9957 | 150 40 77.1 | 48.8 | 0.44 | 45733 |
| 23.5 | .8852390 | 1722 | .4469763 | :0955 | .1939850 | :0141 | 151 9 74.3 | 45.9 | 0.48 | 45269 |
| 24.0 | —.8892166 | 1509 | +.4400719 | 1917 | +.1909888 | :0185 | 151 38 72.0 | 43.5 | +0.53 | 044801 |
| 24.5 | .8931305 | 0657 | .4331356 | 2560 | .1879788 | :0091 | 152 7 70.1 | 41.6 | 0.56 | 44329 |
| 25.0 | .8969802 | 9165 | .4261678 | 2888 | .1849549 | 9859 | 152 36 68.7 | 40.1 | 0.58 | 43853 |
| 25.5 | .9007657 | 7030 | .4191688 | 2904 | .1819177 | 9493 | 153 5 67.8 | 39.1 | 0.60 | 43374 |
| 26.0 | .9044864 | 4247 | .4121395 | 2617 | .1788671 | 8993 | 153 34 67.3 | 38.6 | 0.61 | 42890 |
| 26.5 | —.9081420 | 0813 | +.4050803 | 2031 | +.1758034 | 8362 | 154 3 67.3 | 38.5 | +0.61 | 042402 |
| 27.0 | .9117323 | 6725 | .3979916 | :1150 | .1727268 | 7603 | 154 32 67.7 | 38.9 | 0.62 | 41908 |
| 27.5 | .9152568 | 1979 | .3908738 | 9978 | .1696378 | 6719 | 155 1 68.5 | 39.7 | 0.60 | 41412 |
| 28.0 | .9187154 | 6574 | .3837277 | 8522 | .1665364 | 5711 | 155 30 69.8 | 40.9 | 0.59 | 40911 |
| 28.5 | .9221077 | 0506 | .3765536 | 6787 | .1634228 | 4581 | 155 59 71.6 | 42.6 | 0.55 | 40406 |
| 29.0 | —.9254834 | 3772 | +.3693523 | 4778 | +.1602974 | 3333 | 156 28 73.8 | 44.7 | +0.51 | 039896 |
| 29.5 | .9286921 | 6369 | .3621239 | 2500 | .1571602 | 1967 | 156 57 76.4 | 47.3 | 0.47 | 39382 |
| 30.0 | .9318837 | 8294 | .3548696 | 9963 | .1540116 | 0488 | 157 26 79.5 | 50.3 | 0.43 | 38864 |
| 30.5 | .9350075 | :9541 | .3475895 | 7167 | .1508520 | 8898 | 157 55 83.0 | 53.7 | 0.38 | 38341 |
| 31.0 | .9380636 | 0111 | .3402844 | 4121 | .1476813 | 7198 | 158 24 86.9 | 57.6 | 0.33 | 37813 |
| 31.5 | —.9410515 | :9999 | +.3329545 | :0827 | +.1444999 | 5390 | 158 54 81.2 | 1.8 | +0.27 | 037281 |

| Date. 1856. | RECTANGULAR EQUATORIAL. X. | X′. | Y. | Y′. | Z. | Z′. | POLAR ECLIPTIC. λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ° ′ ″ | ″ | ″ | 0.0 |
| Sept. 1.0 | —.9439713 | 9207 | +.3256007 | 7294 | +.1413080 | 3476 | 159 23 35.9 | 6.5 | +0.21 | 036744 |
| 1.5 | .9468228 | 7732 | .3182232 | 3525 | .1381059 | 1461 | 159 52 41.0 | 11.5 | 0.15 | 36204 |
| 2.0 | .9496055 | 5570 | .3108230 | 9528 | .1348939 | 9346 | 160 21 46.6 | 17.0 | 0.08 | 35660 |
| 2.5 | .9523193 | 2719 | .3034002 | 5305 | .1316723 | 7136 | 160 50 52.4 | 22.8 | +0.01 | 35112 |
| 3.0 | .9549640 | 9177 | .2959559 | :0867 | .1284412 | 4831 | 161 19 58.7 | 29.0 | —0.06 | 34560 |
| 3.5 | —.9575393 | 4941 | +.2884905 | 6218 | +.1252010 | 2434 | 161 48 65.3 | 35.6 | —0.13 | 034005 |
| 4.0 | .9600449 | 0007 | .2810045 | 1363 | .1219517 | 9946 | 162 17 72.4 | 42.6 | 0.19 | 33446 |
| 4.5 | .9624807 | 4375 | .2734981 | 6304 | .1186937 | 7372 | 162 46 79.8 | 50.0 | 0.24 | 32883 |
| 5.0 | .9648467 | 8046 | .2659722 | :1050 | .1154272 | 4713 | 163 15 87.6 | 57.7 | 0.29 | 32317 |
| 5.5 | .9671428 | 1018 | .2584271 | 5604 | .1121525 | 1972 | 163 45 35.9 | 5.9 | 0.34 | 31748 |
| 6.0 | —.9693687 | 3288 | +.2508640 | 9978 | +.1088700 | 9153 | 164 14 44.6 | 14.5 | —0.40 | 031176 |
| 6.5 | .9715241 | 4853 | .2432831 | 4173 | .1055798 | 6256 | 164 43 53.6 | 23.5 | 0.43 | 30602 |
| 7.0 | .9736091 | 5715 | .2356846 | 8194 | .1022821 | 3284 | 165 13 3.0 | 32.8 | 0.45 | 30026 |
| 7.5 | .9756233 | 5868 | .2280699 | 2047 | .0989773 | 9241 | 165 42 12.7 | 42.5 | 0.47 | 29448 |
| 8.0 | .9775669 | 5316 | .2204390 | 5741 | .0956655 | 7128 | 166 11 22.8 | 52.5 | 0.49 | 28867 |
| 8.5 | —.9794394 | 4053 | +.2227924 | 9278 | +.0923469 | 3947 | 166 40 33.2 | 2.9 | —0.50 | 028285 |
| 9.0 | .9812412 | 2083 | .2051307 | 2665 | .0890218 | 0702 | 167 9 44.0 | 13.6 | 0.51 | 27700 |
| 9.5 | .9829717 | 9399 | .1974547 | 5908 | .0856905 | 7394 | 167 38 55.2 | 24.8 | 0.51 | 27115 |
| 10.0 | .9846313 | 6006 | .1897645 | 9009 | .0823532 | 4026 | 168 7 66.8 | 36.3 | 0.49 | 26529 |
| 10.5 | .9862196 | 1900 | .1820608 | 1975 | .0790100 | 0599 | 168 36 78.8 | 48.3 | 0.47 | 25941 |
| 11.0 | —.9877364 | 7080 | +.1743440 | 4810 | +.0756612 | 7116 | 169 6 31.2 | 0.6 | —0.44 | 025353 |
| 11.5 | .9891816 | 1544 | .1666151 | 7524 | .0723069 | 3577 | 169 35 44.1 | 13.5 | 0.40 | 24764 |
| 12.0 | .9905553 | 5293 | .1588741 | :0116 | .0689476 | 9989 | 170 4 57.5 | 26.8 | 0.35 | 24174 |
| 12.5 | .9918571 | 8323 | .1511219 | 2598 | .0655835 | 6353 | 170 33 71.3 | 40.6 | 0.30 | 23584 |
| 13.0 | .9930872 | 0637 | .1433587 | 4969 | .0622147 | 2670 | 171 2 85.5 | 54.7 | 0.25 | 22993 |
| 13.5 | —.9942452 | 2230 | +.1355854 | 7238 | +.0588414 | 8942 | 171 32 40.2 | 9.3 | —0.20 | 022402 |
| 14.0 | .9953313 | 3104 | .1278020 | 9406 | .0554639 | 5171 | 172 1 55.3 | 24.4 | 0.14 | 21810 |
| 14.5 | .9963453 | 3256 | .1200094 | 1483 | .0520824 | 1361 | 172 30 70.9 | 39.9 | —0.07 | 21218 |
| 15.0 | .9972869 | 2684 | .1122080 | 3472 | .0486971 | 7513 | 172 59 87.1 | 56.1 | 0.00 | 20626 |
| 15.5 | .9981564 | 1392 | .1043982 | 5377 | .0453083 | 3630 | 173 29 43.7 | 12.6 | +0.07 | 20034 |
| 16.0 | —.9989534 | 9375 | +.0965809 | 7206 | +.0419161 | 9713 | 173 58 60.9 | 29.7 | +0.14 | 019442 |
| 16.5 | .9996780 | 6633 | .0887566 | 8964 | .0385207 | 5763 | 174 27 78.5 | 47.3 | 0.20 | 18849 |
| 17.0 | 1.0003298 | 3164 | .0809257 | :0657 | .0351225 | 1786 | 174 57 36.7 | 5.4 | 0.26 | 18256 |
| 17.5 | 1.0009089 | 8967 | .0730887 | 2288 | .0317216 | 7782 | 175 26 55.3 | 24.0 | 0.32 | 17662 |
| 18.0 | 1.0014150 | 4041 | .0652461 | 3863 | .0283182 | 3754 | 175 55 74.6 | 43.2 | 0.38 | 17068 |
| 18.5 | -1.0018485 | 8388 | +.0573983 | 5387 | +.0249126 | 9704 | 176 25 34.3 | 2.9 | +0.44 | 016474 |
| 19.0 | 1.0022087 | 2003 | .0495460 | 6865 | .0215050 | 5633 | 176 54 54.6 | 23.1 | 0.51 | 15879 |
| 19.5 | 1.0024959 | 4887 | .0416895 | 8304 | .0180957 | 1546 | 177 23 75.5 | 44.0 | 0.55 | 15284 |
| 20.0 | 1.0027098 | 7038 | .0338303 | 9711 | .0146849 | 7443 | 177 53 37.0 | 5.4 | 0.59 | 14689 |
| 20.5 | 1.0028506 | 8459 | .0259681 | :1090 | 0112729 | 3329 | 178 22 59.0 | 27.3 | 0.62 | 14091 |
| 21.0 | -1.0029178 | 9144 | +.0181036 | 2447 | +.0078599 | 9204 | 178 51 81.6 | 49.9 | +0.65 | 013494 |
| 21.5 | 1.0029117 | 9096 | .0102374 | 3786 | .0044463 | 5073 | 179 21 44.7 | 12.9 | 0.67 | 12895 |
| 22.0 | 1.0028320 | 8313 | +.0023700 | 5112 | +.0010320 | 0934 | 179 50 68.4 | 36.6 | 0.68 | 12296 |
| 22.5 | 1.0026787 | 6793 | —.0054984 | 3572 | —.0023826 | 3208 | 180 20 32.7 | 0.8 | 0.69 | 11694 |
| 23.0 | 1.0024516 | 4536 | .0133659 | 2246 | .0057972 | 7350 | 180 49 57.6 | 25.7 | 0.70 | 11092 |
| 23.5 | -1.0021509 | 1543 | —.0212332 | 0918 | —.0092117 | 1490 | 181 18 83.0 | 51.0 | +0.69 | 010489 |
| 24.0 | 1.0017763 | 7810 | .0290993 | :9579 | .0126256 | 5624 | 181 48 49.1 | 17.1 | 0.67 | 09883 |
| 24.5 | 1.0013278 | 3339 | .0369632 | 8217 | .0160388 | :9752 | 182 17 75.6 | 43.5 | 0.64 | 09276 |
| 25.0 | 1.0008054 | 8129 | .0448249 | 6833 | .0194508 | 3868 | 182 47 42.8 | 10.7 | 0.61 | 08666 |
| 25.5 | 1.0002091 | 2180 | .0526837 | 5420 | .0228615 | 7970 | 183 16 70.4 | 38.2 | 0.57 | 08056 |
| 26.0 | —.9995391 | 5492 | —.0605389 | 3970 | —.0262707 | 2057 | 183 46 38.7 | 6.4 | +0.52 | 007443 |
| 26.5 | .9987951 | 8068 | .0683895 | 2477 | .0296780 | 6127 | 184 15 67.4 | 35.1 | 0.48 | 06828 |
| 27.0 | .9979769 | 9899 | .0762354 | 0937 | .0330833 | 0177 | 184 45 36.7 | 4.3 | 0.43 | 06211 |
| 27.5 | .9970850 | 0993 | .0840757 | :9341 | .0364863 | 4204 | 185 14 66.6 | 34.2 | 0.37 | 05592 |
| 28.0 | .9961191 | 1348 | .0919099 | 7684 | .0398865 | 8203 | 185 44 37.1 | 4.6 | 0.30 | 04971 |
| 28.5 | —.9950793 | 0963 | —.0997373 | 5958 | —.0432837 | 2172 | 186 13 67.9 | 35.4 | +0.24 | 004348 |
| 29.0 | .9939658 | 9841 | .1075572 | 4158 | .0466778 | 6110 | 186 43 39.3 | 6.7 | 0.17 | 03723 |
| 29.5 | .9927786 | 7983 | .1153687 | 2274 | .0500684 | 0013 | 187 12 71.1 | 38.5 | 0.11 | 03096 |
| 30.0 | .9915180 | 5391 | .1231718 | 0306 | .0534553 | 3879 | 187 42 43.6 | 10.9 | +0.04 | 02467 |
| 30.5 | .9901836 | 2060 | .1309657 | 8246 | .0568380 | 7703 | 188 11 76.4 | 43.7 | —0.02 | 01837 |
| Oct. 1.0 | —.9887759 | 7996 | —.1387499 | 6090 | —.0602167 | 1487 | 188 41 49.9 | 17.1 | —0.08 | 001204 |

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | | | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° | ′ | ″ | ″ | ″ | 0.0 |
| Oct. 1.5 | —.9872941 | 3192 | —.1465239 | 3831 | —.0635909 | 5226 | 189 | 10 | 83.7 | 50.9 | —0.14 | 000571 |
| 2.0 | .9857393 | 7658 | .1542870 | 1464 | .0669602 | 8915 | 189 | 40 | 58.2 | 25.3 | 0.21 | ▣99936 |
| 2.5 | .9841112 | 1391 | .1620381 | 8976 | .0703244 | 2554 | 190 | 20 | 33.0 | 57.1 | 0.26 | 999300 |
| 3.0 | .9824102 | 4396 | .1697771 | 6367 | .0736832 | 6138 | 190 | 39 | 68.4 | 35.4 | 0.31 | 98662 |
| 3.5 | .9806364 | 6672 | .1775029 | 3626 | .0770364 | 9666 | 191 | 9 | 43.0 | 10.0 | 0.35 | 98024 |
| 4.0 | —.9787899 | 8222 | —.1852154 | 0753 | —.0803837 | 3136 | 191 | 38 | 80.3 | 47.2 | —0.39 | 997383 |
| 4.5 | .9768703 | 9040 | .1929138 | 7739 | .0837248 | 6543 | 192 | 8 | 56.8 | 23.7 | 0.41 | 96744 |
| 5.0 | .9748784 | 9136 | .2005974 | 4577 | .0870595 | :9886 | 192 | 38 | 34.0 | 0.8 | 0.43 | 96102 |
| 5.5 | .9728142 | 8508 | .2082654 | 1257 | .0903874 | 3161 | 193 | 7 | 71.4 | 38.2 | 0.44 | 95462 |
| 6.0 | .9706779 | 7159 | .2159178 | 7783 | .0937085 | 6368 | 193 | 37 | 49.4 | 16.1 | 0.45 | 94820 |
| 6.5 | —.9684695 | 5089 | —.2235539 | 4146 | —.0970225 | :9506 | 194 | 6 | 87.7 | 54.3 | —0.44 | 994181 |
| 7.0 | .9661894 | 2303 | .2311732 | 0342 | .1003292 | 2570 | 194 | 36 | 66.6 | 33.2 | 0.43 | 93539 |
| 7.5 | .9638375 | 8798 | .2387749 | 6362 | .1036281 | 5557 | 195 | 6 | 45.9 | 12.4 | 0.41 | 92901 |
| 8.0 | .9614138 | 4576 | .2463587 | 2202 | .1069193 | 8467 | 195 | 35 | 85.7 | 52.2 | 0.38 | 92260 |
| 8.5 | .9589191 | 9644 | .2539237 | 7854 | .1102023 | 1295 | 196 | 5 | 65.7 | 32.1 | 0.34 | 91624 |
| 9.0 | —.9563537 | 4005 | —.2614696 | 3316 | —.1134770 | 4040 | 196 | 35 | 46.4 | 12.7 | —0.30 | 990985 |
| 9.5 | .9537177 | 7659 | .2689957 | 8580 | .1167430 | 6697 | 197 | 4 | 87.4 | 53.7 | 0.26 | 90352 |
| 10.0 | .9510108 | 0605 | .2765017 | 3643 | .1200002 | :9266 | 197 | 34 | 68.9 | 35.1 | 0.22 | 89717 |
| 10.5 | .9482332 | 2843 | .2839866 | 8495 | .1232482 | 1744 | 198 | 4 | 50.9 | 17.1 | 0.16 | 89087 |
| 11.0 | .9453855 | 4381 | .2914506 | 3138 | .1264871 | 4131 | 198 | 33 | 93.3 | 59.4 | 0.10 | 88455 |
| 11.5 | —.9424675 | 5215 | —.2988928 | 7564 | —.1297164 | 6423 | 199 | 3 | 76.2 | 42.2 | —0.04 | 987828 |
| 12.0 | .9394798 | 5352 | .3063129 | 1769 | .1329362 | 8619 | 199 | 33 | 59.5 | 25.5 | +0.03 | 87200 |
| 12.5 | .9364221 | 4789 | .3137101 | 5744 | .1361461 | 0716 | 200 | 3 | 43.5 | 9.4 | 0.09 | 86576 |
| 13.0 | .9332948 | 3530 | .3210841 | :9484 | .1393460 | 2713 | 200 | 32 | 87.9 | 53.8 | 0.16 | 85953 |
| 13.5 | .9300983 | 1579 | .3284340 | 2990 | .1425356 | 4607 | 201 | 2 | 72.9 | 38.7 | 0.23 | 85334 |
| 14.0 | —.9268328 | 8938 | —.3357595 | 6248 | —.1457145 | 6395 | 201 | 32 | 58.4 | 24.1 | +0.30 | 984717 |
| 14.5 | .9234985 | 5610 | .3430599 | :9256 | .1488823 | 8071 | 202 | 2 | 44.3 | 10.0 | 0.36 | 84103 |
| 15.0 | .9200954 | 1593 | .3503349 | 2010 | .1520392 | :9638 | 202 | 31 | 90.8 | 56.4 | 0.42 | 83491 |
| 15.5 | .9166237 | 6890 | .3575835 | 4500 | .1551849 | 1093 | 203 | 1 | 77.7 | 43.2 | 0.47 | 82882 |
| 16.0 | .9130838 | 1505 | .3648057 | 6726 | .1583190 | 2432 | 203 | 31 | 65.2 | 31.7 | 0.53 | 82275 |
| 16.5 | —.9094759 | 5441 | —.3720009 | :8682 | —.1614414 | 3655 | 204 | 1 | 53.2 | 18.6 | +0.58 | 981671 |
| 17.0 | .9057994 | 8689 | .3791687 | 0365 | .1645519 | 4759 | 204 | 31 | 41.8 | 7.2 | 0.62 | 81068 |
| 17.5 | .9020553 | 1262 | .3863084 | 1767 | .1676500 | 5739 | 205 | 0 | 90.9 | 56.2 | 0.66 | 80468 |
| 18.0 | .8982440 | 3163 | .3934195 | 2883 | .1707359 | 6597 | 205 | 30 | 80.6 | 46.9 | 0.68 | 79870 |
| 18.5 | .8943654 | 4393 | .4005015 | 3708 | .1738094 | 7331 | 206 | 0 | 70.8 | 36.0 | 0.70 | 79275 |
| 19.0 | —.8904194 | 4947 | —.4075537 | 4235 | —.1768699 | 7934 | 206 | 30 | 61.7 | 27.8 | +0.72 | 978681 |
| 19.5 | .8864067 | 4835 | .4145754 | 4457 | .1799172 | 8406 | 207 | 0 | 53.0 | 18.1 | 0.72 | 78090 |
| 20.0 | .8823276 | 4058 | .4215665 | 4373 | .1829512 | 8745 | 207 | 30 | 44.9 | 9.9 | 0.73 | 77501 |
| 20.5 | .8781820 | 2616 | .4285261 | 3974 | .1859716 | 8948 | 208 | 0 | 37.3 | 2.2 | 0.73 | 76914 |
| 21.0 | .8739700 | :0511 | .4354541 | 3260 | .1889783 | 9014 | 208 | 29 | 90.4 | 55.2 | 0.72 | 76328 |
| 21.5 | —.8696924 | 7750 | —.4423496 | 2220 | —.1919712 | 8943 | 208 | 59 | 84.0 | 48.8 | +0.70 | 975744 |
| 22.0 | .8653491 | 4331 | .4492124 | 0853 | .1949497 | 8727 | 209 | 29 | 78.2 | 42.9 | 0.67 | 75162 |
| 22.5 | .8609403 | :0257 | .4560417 | :9152 | .1979137 | 8366 | 209 | 59 | 73.0 | 37.7 | 0.63 | 74582 |
| 23.0 | .8564661 | 5529 | .4628370 | 7111 | .2008630 | 7858 | 209 | 29 | 68.5 | 33.1 | 0.59 | 74001 |
| 23.5 | .8519269 | :0151 | .4695975 | 4721 | .2037970 | 7198 | 210 | 59 | 64.3 | 28.8 | 0.54 | 73423 |
| 24.0 | —.8473231 | 4128 | —.4763228 | 1980 | —.2067159 | 6386 | 210 | 29 | 60.8 | 25.3 | +0.49 | 972844 |
| 24.5 | .8426553 | 7465 | .4830123 | 8880 | .2096193 | 5419 | 211 | 59 | 57.8 | 22.2 | 0.44 | 72268 |
| 25.0 | .8379236 | :0162 | .4896655 | 5418 | .2125069 | 4294 | 212 | 29 | 55.4 | 19.7 | 0.38 | 71691 |
| 25.5 | .8331286 | 2226 | .4962814 | 1583 | .2153784 | 3009 | 212 | 59 | 53.4 | 17.7 | 0.31 | 71116 |
| 26.0 | .8282697 | 3651 | .5028599 | 7374 | .2182338 | 1562 | 213 | 29 | 52.1 | 16.3 | 0.24 | 70541 |
| 26.5 | —.8233481 | 4449 | —.5094003 | 2784 | —.2210725 | :9949 | 213 | 59 | 51.1 | 15.2 | +0.17 | 969967 |
| 27.0 | .8183642 | 4624 | .5159023 | 7810 | .2238947 | 8171 | 214 | 29 | 50.7 | 14.8 | 0.10 | 69393 |
| 27.5 | .8133179 | 4175 | .5223652 | 2445 | .2266999 | 6222 | 214 | 59 | 50.7 | 14.7 | +0.04 | 68821 |
| 28.0 | .8082095 | 3105 | .5287886 | 6685 | .2294880 | 4102 | 215 | 29 | 51.4 | 15.3 | —0.02 | 68249 |
| 28.5 | .8030393 | 1417 | .5351717 | 0523 | .2322583 | 1805 | 215 | 59 | 52.5 | 16.3 | 0.07 | 67679 |
| 29.0 | —.7978086 | 9124 | —.5415143 | 3955 | —.2350111 | :9332 | 216 | 29 | 54.1 | 17.9 | —0.13 | 967108 |
| 29.5 | .7925173 | 6225 | .5478156 | 6975 | .2377459 | 6680 | 216 | 59 | 56.1 | 19.8 | 0.18 | 66540 |
| 30.0 | .7871658 | 2724 | .5540751 | :9577 | .2404628 | 3848 | 217 | 29 | 58.6 | 22.3 | 0.24 | 65971 |
| 30.5 | .7817544 | 8624 | .5602921 | 1754 | .2431611 | 0831 | 217 | 59 | 61.5 | 25.1 | 0.27 | 65405 |
| 31.0 | .7762835 | 3929 | .5664665 | 3505 | .2458408 | 7627 | 218 | 29 | 61.9 | 25.4 | 0.31 | 64839 |
| 31.5 | —.7707536 | 8645 | —.5725974 | 4822 | —.2485017 | 4237 | 218 | 59 | 65.5 | 28.9 | —0.34 | 964275 |

▣ The first figures of this and the following logarithms are 9.9.

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X′. | Y. | Y′. | Z. | Z′. | λ = ☉'s True Longitude. | λ′ | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° ′ ″ | ″ | ″ | 9.9 |
| Nov. 1.0 | —.7651654 | 2777 | —.5786846 | 5702 | —.2511436 | 0657 | 219 29 72.6 | 36.0 | —0.36 | 963710 |
| 1.5 | .7595190 | 6327 | .5847277 | 6141 | .2537662 | 6884 | 219 59 77.1 | 40.4 | 0.38 | 63149 |
| 2.0 | .7538146 | 9297 | .5907260 | 6132 | .2563694 | 2917 | 220 29 82.1 | 45.4 | 0.39 | 62589 |
| 2.5 | .7480531 | 1697 | .5966792 | 5673 | .2589529 | 8753 | 220 59 87.4 | 50.6 | 0.39 | 62030 |
| 3.0 | .7422350 | 3531 | .6025867 | 4756 | .2615166 | 4391 | 220 29 93.2 | 56.3 | 0.39 | 61473 |
| 3.5 | —.7363606 | 4802 | —.6084480 | 3377 | —.2640602 | :9828 | 222 0 39.3 | 2.3 | —0.37 | 960919 |
| 4.0 | .7304306 | 5516 | .6142627 | 1532 | .2665836 | 5063 | 222 30 45.9 | 8.9 | 0.35 | 60368 |
| 4.5 | .7244454 | 5678 | .6200304 | :9217 | .2690865 | 0093 | 223 0 52.8 | 15.7 | 0.32 | 59821 |
| 5.0 | .7184053 | 5292 | .6257508 | 6430 | .2715688 | 4917 | 223 30 60.2 | 23.0 | 0.28 | 59274 |
| 5.5 | .7123108 | 4360 | .6314231 | 3162 | .2740303 | 9533 | 224 0 67.8 | 30.5 | 0.24 | 58731 |
| 6.0 | —.7061625 | 2889 | —.6370472 | :9412 | —.2764709 | 3941 | 224 30 75.8 | 38.5 | —0.19 | 958191 |
| 6.5 | .6999606 | :0883 | .6426224 | 5173 | .2788900 | 8134 | 225 0 84.1 | 46.7 | 0.14 | 57655 |
| 7.0 | .6937058 | 8347 | .6481487 | 0445 | .2812882 | 2117 | 225 30 92.9 | 55.5 | 0.09 | 57123 |
| 7.5 | .6873985 | 5286 | .6536254 | 5221 | .2836646 | 5883 | 226 1 41.9 | 4.4 | —0.03 | 56594 |
| 8.0 | .6810391 | 1705 | .6590525 | :9501 | .2860195 | :9435 | 226 31 51.4 | 13.8 | +0.03 | 56069 |
| 8.5 | —.6746281 | 7607 | —.6644295 | 3281 | —.2883525 | 2769 | 227 1 60.2 | 22.6 | +0.10 | 955549 |
| 9.0 | .6681661 | 2999 | .6697559 | 6554 | .2906636 | 5883 | 227 31 71.4 | 33.7 | 0.17 | 55033 |
| 9.5 | .6616537 | 7888 | .6750310 | :9315 | .2929524 | 8775 | 228 1 82.0 | 44.2 | 0.24 | 54522 |
| 10.0 | .6550915 | 2278 | .6802548 | 1563 | .2952191 | 1446 | 228 31 93.0 | 55.1 | 0.31 | 54015 |
| 10.5 | .6484793 | 6170 | .6854267 | 3291 | .2974633 | 3890 | 229 2 44.3 | 6.3 | 0.37 | 53515 |
| 11.0 | —.6418182 | 9572 | —.6905464 | 4498 | —.2996850 | 6110 | 229 32 56.1 | 18.1 | +0.43 | 953017 |
| 11.5 | .6351083 | 2486 | .6956135 | 5179 | .3018837 | 8100 | 230 2 68.2 | 30.1 | 0.49 | 52527 |
| 12.0 | .6283502 | 4918 | .7006276 | 5330 | .3040595 | :9860 | 230 32 80.7 | 42.5 | 0.56 | 52038 |
| 12.5 | .6215440 | 6869 | .7055882 | 4947 | .3062120 | 1388 | 231 2 93.5 | 55.2 | 0.60 | 51556 |
| 13.0 | .6146905 | 8347 | .7104953 | 4028 | .3083414 | 2684 | 231 33 46.8 | 8.4 | 0.64 | 51078 |
| 13.5 | —.6077900 | 9355 | —.7153483 | 2567 | —.3104473 | 3746 | 232 3 60.5 | 22.1 | +0.67 | 950606 |
| 14.0 | .6008427 | 9900 | .7201470 | 0565 | .3125297 | 4574 | 232 33 74.7 | 36.2 | 0.70 | 50137 |
| 14.5 | .5938503 | 9984 | .7248909 | 8014 | .3145882 | 5161 | 233 3 89.3 | 50.7 | 0.73 | 49675 |
| 15.0 | .5868121 | 9615 | .7295797 | 4912 | .3166230 | 5510 | 233 34 44.4 | 5.7 | 0.75 | 49218 |
| 15.5 | .5797285 | 8797 | .7342126 | 1252 | .3186336 | 5620 | 234 4 59.8 | 21.0 | 0.75 | 48767 |
| 16.0 | —.5726015 | 7535 | —.7387900 | 7037 | —.3206201 | 5488 | 234 34 75.7 | 36.9 | +0.76 | 948320 |
| 16.5 | .5654298 | 5830 | .7433115 | 2263 | .3225822 | 5112 | 235 4 92.1 | 53.2 | 0.75 | 47879 |
| 17.0 | .5582147 | 3691 | .7477762 | 6921 | .3245198 | 4490 | 235 35 48.9 | 9.9 | 0.74 | 47441 |
| 17.5 | .5509564 | :1121 | .7521835 | 1005 | .3264326 | 3621 | 236 5 66.2 | 27.1 | 0.73 | 47009 |
| 18.0 | .5436556 | 8126 | .7565337 | 4518 | .3283206 | 2503 | 236 35 83.9 | 44.7 | 0.70 | 46580 |
| 18.5 | —.5363125 | 4708 | —.7608259 | 7451 | —.3301835 | 1135 | 237 6 42.1 | 2.8 | +0.67 | 946156 |
| 19.0 | .5289281 | :0877 | .7650591 | :9804 | .3320212 | :9515 | 237 36 60.7 | 21.3 | 0.62 | 45736 |
| 19.5 | .5215031 | 6639 | .7692358 | 1572 | .3338334 | 7641 | 238 6 79.7 | 40.2 | 0.58 | 45321 |
| 20.0 | .5140376 | 1996 | .7733525 | 2751 | .3356202 | 5511 | 238 36 99.2 | 59.6 | 0.53 | 44910 |
| 20.5 | .5065324 | 6956 | .7774096 | 3334 | .3373812 | 3125 | 239 7 59.0 | 19.3 | 0.48 | 44503 |
| 21.0 | —.4989879 | :1523 | —.7814072 | 3322 | —.3391165 | 0482 | 239 37 79.2 | 39.5 | +0.42 | 944100 |
| 21.5 | .4914047 | 5703 | .7853446 | 2708 | .3408257 | 7578 | 240 8 39.8 | 0.0 | 0.36 | 43701 |
| 22.0 | .4837832 | 9499 | .7892219 | 1493 | .3425087 | 4411 | 240 38 60.9 | 21.0 | 0.29 | 43306 |
| 22.5 | .4761239 | 2917 | .7930383 | :9670 | .3441652 | 0980 | 241 8 82.3 | 42.3 | 0.22 | 42913 |
| 23.0 | .4684276 | 5966 | .7967937 | 7236 | .3457953 | 7285 | 241 39 44.2 | 4.1 | 0.25 | 42525 |
| 23.5 | —.4606947 | 8648 | —.8004876 | 4188 | —.3473986 | 3322 | 242 9 66.5 | 26.3 | +0.09 | 942138 |
| 24.0 | .4529259 | :0972 | .8041197 | 0521 | .3489752 | 9092 | 242 39 89.2 | 48.9 | +0.02 | 41755 |
| 24.5 | .4451220 | 2945 | .8076894 | 6230 | .3505247 | 4591 | 243 10 52.2 | 11.8 | —0.04 | 41375 |
| 25.0 | .4372834 | 4571 | .8111970 | 1319 | .3520472 | 9820 | 243 40 75.6 | 35.1 | 0.10 | 40998 |
| 25.5 | .4294107 | 5855 | .8146419 | 5780 | .3535424 | 4776 | 244 10 99.2 | 58.6 | 0.15 | 40624 |
| 26.0 | —.4215048 | 6807 | —.8180234 | :9609 | —.3550103 | 9459 | 244 41 63.3 | 22.7 | —0.20 | 940254 |
| 26.5 | .4135664 | 7434 | .8213417 | 2805 | .3564506 | 3866 | 245 11 87.6 | 46.9 | 0.25 | 39886 |
| 27.0 | .4055960 | 7740 | .8245962 | 5363 | .3578632 | 7996 | 245 42 52.3 | 11.5 | 0.29 | 39521 |
| 27.5 | .3975941 | 7731 | .8277866 | 7281 | .3592479 | 1847 | 246 12 77.1 | 36.2 | 0.32 | 39159 |
| 28.0 | .3895613 | 7414 | .8309128 | 8556 | .3606048 | 5420 | 246 43 42.4 | 1.4 | 0.35 | 38801 |
| 28.5 | —.3814983 | 6795 | —.8339748 | 9190 | —.3619335 | 8711 | 247 13 67.8 | 26.7 | —0.37 | 938445 |
| 29.0 | .3734058 | 5881 | .8369720 | 9176 | .3632343 | 1723 | 247 43 93.7 | 52.5 | 0.39 | 38093 |
| 29.5 | .3652844 | 4678 | .8399042 | 8512 | .3645068 | 4452 | 248 14 59.7 | 18.4 | 0.39 | 37744 |
| 30.0 | .3571350 | 3195 | .8427713 | 7197 | .3657512 | 6901 | 248 44 86.2 | 44.8 | 0.40 | 37399 |
| 30.5 | .3489580 | :1435 | .8455730 | 5228 | .3669671 | 9065 | 249 15 52.8 | 11.3 | 0.39 | 37058 |
| Dec. 1.0 | —.3407542 | 9407 | —.8483091 | 2603 | —.3681545 | 0944 | 249 45 79.6 | 38.0 | —0.37 | 936720 |

| Date. 1856. | RECTANGULAR EQUATORIAL. | | | | | | POLAR ECLIPTIC. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X. | X'. | Y. | Y'. | Z. | Z'. | λ = ☉'s True Longitude. | | | λ' | δ = ☉'s Latitude. | Log. Rad. Vect. = ρ |
| | | | | | | | ° | ' | " | " | " | 9.9 |
| Dec. 1.5 | —.3325243 | 7118 | —.8509793 | 9320 | —.3693130 | 2534 | 250 | 16 | 46.6 | 4.9 | —0.34 | 936387 |
| 2.0 | .3242687 | 4572 | .8535834 | 5375 | .3704430 | 3839 | 250 | 46 | 73.8 | 32.0 | 0.31 | 36058 |
| 2.5 | .3159887 | :1782 | .8561210 | 0766 | .3715442 | 4857 | 251 | 16 | 101.2 | 59.3 | 0.27 | 35733 |
| 3.0 | .3076847 | 8752 | .8585923 | 5492 | .3726164 | 5584 | 251 | 47 | 68.8 | 26.8 | 0.23 | 35411 |
| 3.5 | .2993569 | 5484 | .8609968 | 9552 | .3736596 | 6021 | 252 | 17 | 96.5 | 54.4 | 0.18 | 35094 |
| 4.0 | —.2910066 | 1991 | —.8633348 | 2947 | —.3746738 | 6169 | 252 | 48 | 64.5 | 22.3 | —0.13 | 934782 |
| 4.5 | .2826341 | 8276 | .8656056 | 5669 | .3756590 | 6026 | 253 | 18 | 92.6 | 50.6 | 0.08 | 34474 |
| 5.0 | .2742402 | 4347 | .8678096 | .7723 | .3766151 | 5593 | 253 | 49 | 60.9 | 18.5 | —0.00 | 34173 |
| 5.5 | .2658251 | :0205 | .8699462 | 9104 | .3775419 | 4868 | 254 | 19 | 89.4 | 46.9 | +0.06 | 33876 |
| 6.0 | .2573899 | 5862 | .8720156 | :9814 | .3784396 | 3851 | 254 | 50 | 58.1 | 15.5 | 0.13 | 33585 |
| 6.5 | —.2489353 | :1325 | —.8740172 | :9844 | —.3793080 | 2542 | 255 | 20 | 86.8 | 44.1 | +0.19 | 933300 |
| 7.0 | .2404618 | 6599 | .8759515 | 9202 | .3801470 | 0938 | 255 | 51 | 55.8 | 13.0 | 0.26 | 33020 |
| 7.5 | .2319703 | :1694 | .8778182 | 7885 | .3809566 | 9041 | 256 | 21 | 84.9 | 42.0 | 0.32 | 32746 |
| 8.0 | .2234612 | 6612 | .8796167 | 5886 | .3817368 | 6850 | 256 | 52 | 54.2 | 12.2 | 0.38 | 32477 |
| 8.5 | .2149348 | :1358 | .8813471 | 3206 | .3824875 | 4364 | 257 | 22 | 83.6 | 41.5 | 0.44 | 32216 |
| 9.0 | —.2063922 | 5940 | —.8830093 | :9844 | —.3832086 | 1582 | 257 | 53 | 53.2 | 11.0 | +0.50 | 931961 |
| 9.5 | .1978335 | :0362 | .8846036 | 5802 | .3839002 | 8505 | 258 | 23 | 83.0 | 40.7 | 0.55 | 31713 |
| 10.0 | .1892598 | 4633 | .8861298 | 1080 | .3845622 | 5131 | 258 | 54 | 53.0 | 10.6 | 0.60 | 31471 |
| 10.5 | .1806716 | 8760 | .8875874 | 5672 | .3851945 | 1460 | 259 | 24 | 83.2 | 39.7 | 0.64 | 31237 |
| 11.0 | .1720696 | 2748 | .8889766 | 9580 | .3857971 | 7492 | 259 | 55 | 53.6 | 10.0 | 0.68 | 31008 |
| 11.5 | —.1634546 | 6605 | —.8902968 | 2799 | —.3863699 | 3226 | 260 | 25 | 84.1 | 40.4 | +0.70 | 930786 |
| 12.0 | .1548270 | :0336 | .8915484 | 5331 | .3869130 | 8663 | 260 | 56 | 54.8 | 11.0 | 0.73 | 30570 |
| 12.5 | .1461873 | 3946 | .8927309 | 7173 | .3874263 | 3802 | 261 | 26 | 85.6 | 41.7 | 0.74 | 30363 |
| 13.0 | .1375362 | 7442 | .8938448 | 8329 | .3879096 | 8641 | 261 | 57 | 56.6 | 12.6 | 0.75 | 30161 |
| 13.5 | .1288745 | :0833 | .8948894 | 8791 | .3883630 | 3181 | 262 | 27 | 87.8 | 43.7 | 0.75 | 29967 |
| 14.0 | —.1202023 | 4119 | —.8958654 | 8568 | —.3887865 | 7422 | 262 | 58 | 59.3 | 15.1 | +0.74 | 929777 |
| 14.5 | .1115204 | 7307 | .8967718 | 7649 | .3891801 | 1364 | 263 | 28 | 91.0 | 46.7 | 0.72 | 29499 |
| 15.0 | .1028300 | :0410 | .8976091 | 6037 | .3895435 | 5005 | 263 | 59 | 62.9 | 18.5 | 0.70 | 29424 |
| 15.5 | .0941317 | 3433 | .8983766 | 3728 | .3898768 | 8345 | 264 | 29 | 94.9 | 50.4 | 0.66 | 29256 |
| 16.0 | .0854258 | 6379 | .8990746 | 0725 | .3901799 | 1383 | 265 | 0 | 67.1 | 22.6 | 0.61 | 29094 |
| 16.5 | —.0767128 | 9254 | —.8997030 | 7026 | —.3904526 | 4118 | 265 | 30 | 99.5 | 54.9 | +0.57 | 928937 |
| 17.0 | .0679933 | :2064 | .9002616 | 2630 | .3906952 | 6551 | 266 | 1 | 72.1 | 27.4 | 0.52 | 28786 |
| 17.5 | .0592681 | 4816 | .9007503 | 7534 | .3909075 | 8682 | 266 | 32 | 45.0 | 0.2 | 0.47 | 28644 |
| 18.0 | .0505379 | 7520 | .9011693 | 1741 | .3910897 | 0511 | 267 | 2 | 78.1 | 33.2 | 0.42 | 28508 |
| 18.5 | .0418034 | :0180 | .9015183 | 5249 | .3912415 | 2037 | 267 | 33 | 51.4 | 6.4 | 0.36 | 28377 |
| 19.0 | —.0330652 | 2803 | —.9017974 | 8058 | —.3913631 | 3260 | 268 | 3 | 84.9 | 39.8 | +0.29 | 928250 |
| 19.5 | .0243241 | 5397 | .9020063 | 0165 | .3914540 | 4177 | 268 | 34 | 58.6 | 13.4 | 0.23 | 28130 |
| 20.0 | .0155806 | 7967 | .9021451 | 1571 | .3915146 | 4791 | 269 | 4 | 32.5 | 47.2 | 0.16 | 28015 |
| 20.5 | —.0068354 | :0520 | .9022138 | 2275 | .3915447 | 5099 | 269 | 35 | 66.5 | 21.1 | 0.10 | 27906 |
| 21.0 | +.0019107 | 6936 | .9022121 | 2276 | .3915443 | 5104 | 270 | 5 | 100.7 | 55.2 | +0.03 | 27800 |
| 21.5 | +.0106568 | 4393 | —.9021401 | 1574 | —.3915134 | 4802 | 270 | 36 | 75.0 | 29.4 | —0.03 | 927702 |
| 22.0 | .0194025 | 1846 | .9019977 | 0168 | 3914519 | 4195 | 271 | 7 | 49.6 | 3.9 | 0.09 | 27607 |
| 22.5 | .0281470 | :9286 | .9017848 | 8057 | .3913599 | 3283 | 271 | 37 | 84.2 | 38.4 | 0.15 | 27517 |
| 23.0 | .0368895 | 6706 | .9015014 | 5240 | .3912372 | 2064 | 272 | 8 | 59.0 | 13.1 | 0.21 | 27431 |
| 23.5 | .0456295 | 4102 | .9011478 | 1722 | .3910840 | 0540 | 272 | 38 | 93.9 | 47.9 | 0.25 | 27350 |
| 24.0 | +.0543661 | 1463 | —.9007238 | 7500 | —.3909001 | 8709 | 273 | 9 | 69.0 | 22.9 | —0.30 | 927273 |
| 24.5 | .0630986 | :8783 | .9002294 | 2574 | .3906858 | 6574 | 273 | 39 | 104.0 | 57.8 | 0.33 | 27201 |
| 25.0 | .0718262 | 6055 | .8996648 | 6947 | .3904408 | 4132 | 274 | 10 | 69.3 | 33.0 | 0.37 | 27133 |
| 25.5 | .0805482 | 3272 | .8990297 | 0613 | .3901653 | 1385 | 274 | 41 | 54.5 | 8.1 | 0.39 | 27069 |
| 26.0 | .0892640 | 0428 | .8983242 | 3576 | .3898591 | 8332 | 275 | 11 | 89.9 | 43.4 | 0.41 | 27009 |
| 26.5 | +.0979729 | 7514 | —.8975483 | 5835 | —.3895224 | 4974 | 275 | 42 | 65.2 | 18.6 | —0.42 | 926953 |
| 27.0 | .1066742 | 4525 | .8967024 | 7394 | .3891553 | 1312 | 276 | 12 | 100.7 | 54.0 | 0.43 | 26901 |
| 27.5 | .1153673 | 1453 | .8957864 | 8252 | .3887579 | 7347 | 276 | 43 | 76.1 | 29.3 | 0.42 | 26854 |
| 28.0 | .1240513 | :8290 | .8948004 | 8411 | .3883298 | 3075 | 277 | 14 | 51.7 | 4.8 | 0.41 | 26810 |
| 28.5 | .1327254 | 5029 | .8937444 | 7870 | .3878713 | 8499 | 277 | 44 | 87.1 | 40.1 | 0.39 | 26772 |
| 29.0 | +.1413890 | 1663 | —.8926185 | 6629 | —.3873826 | 3621 | 278 | 15 | 62.8 | 15.7 | —0.37 | 926737 |
| 29.5 | .1500412 | :8182 | .8914229 | 4692 | .3868635 | 8438 | 278 | 45 | 98.2 | 51.0 | 0.33 | 26707 |
| 30.0 | .1586814 | 4581 | .8901572 | 2054 | .3863142 | 2954 | 279 | 16 | 73.8 | 26.5 | 0.28 | 26681 |
| 30.5 | .1673089 | 0853 | .8888224 | 8716 | .3857346 | 7166 | 279 | 47 | 49.0 | 1.6 | 0.24 | 26659 |
| 31.0 | .1759230 | 6991 | .8874184 | 4678 | .3851250 | 1079 | 280 | 17 | 84.5 | 37.0 | 0.19 | 26642 |
| 31.5 | .1845230 | 2987 | .8859449 | 9940 | .3844853 | 4690 | 280 | 48 | 59.6 | 12.0 | 0.13 | 26632 |
| 32.0 | +.1931082 | :8837 | —.8844026 | 4502 | —.3838157 | 8003 | 281 | 18 | 95.0 | 47.3 | —0.07 | 926625 |

| | MERCURY. | | | | | | VENUS. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. | | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. | |
| 239 | | | | | ° | ′ | | | | | ° | ′ |
| 8950 | +0.0939 | —0.3871 | —0.2173 | 9.6570 | 282 | 12.0 | —0.6586 | +0.2448 | +0.1521 | 9.8567 | 156 | 36.5 |
| 8955 | 0.1982 | 0.3348 | 0.2001 | 9.6410 | 297 | 16.5 | 0.6926 | 0.1567 | 0.1144 | 9.8569 | 164 | 42.8 |
| 8960 | 0.2849 | 0.2531 | 0.1650 | 9.6183 | 313 | 45.3 | 0.7128 | +0.0656 | 0.0745 | 9.8572 | 172 | 48.6 |
| 8965 | 0.3421 | 0.1457 | 0.1129 | 9.5894 | 332 | 20.4 | 0.7190 | —0.0269 | +0.0331 | 9.8575 | 180 | 53.7 |
| 8970 | 0.3560 | —0.0204 | —0.0470 | 9.5559 | 353 | 47.3 | 0.7109 | 0.1189 | —0.0091 | 9.8578 | 188 | 58.1 |
| 8975 | +0.3140 | +0.1072 | +0.0259 | 9.5221 | 18 | 54.7 | —0.6887 | —0.2085 | —0.0513 | 9.8582 | 197 | 1.8 |
| 8980 | 0.2105 | 0.2128 | 0.0932 | 9.4962 | 47 | 50.2 | 0.6531 | 0.2940 | 0.0925 | 9.8586 | 205 | 4.5 |
| 8985 | +0.0585 | 0.2684 | 0.1385 | 9.4880 | 79 | 12.6 | 0.6046 | 0.3738 | 0.1318 | 9.8590 | 213 | 6.4 |
| 8990 | —0.1080 | 0.2580 | 0.1497 | 9.5014 | 110 | 11.7 | 0.5443 | 0.4462 | 0.1674 | 9.8594 | 221 | 7.4 |
| 8995 | 0.2510 | 0.1892 | 0.1272 | 9.5303 | 138 | 13.0 | 0.4733 | 0.5099 | 0.2006 | 9.8598 | 229 | 7.5 |
| 9000 | —0.3479 | +0.0844 | +0.0806 | 9.5647 | 102 | 21.8 | —0.3932 | —0.5637 | —0.2300 | 9.8602 | 237 | 6.7 |
| 9005 | 0.3936 | —0.0336 | +0.0217 | 9.5973 | 183 | 1.2 | 0.3054 | 0.6066 | 0.2549 | 9.8606 | 245 | 4.9 |
| 9010 | 0.3924 | 0.1482 | —0.0401 | 9.6247 | 200 | 59.3 | 0.2118 | 0.6377 | 0.2748 | 9.8609 | 253 | 2.4 |
| 9015 | 0.3525 | 0.2484 | 0.0980 | 9.6456 | 217 | 3.3 | 0.1140 | 0.6566 | 0.2895 | 9.8613 | 260 | 59.1 |
| 9020 | 0.2824 | 0.3276 | 0.1477 | 9.6599 | 231 | 52.0 | —0.0140 | 0.6628 | 0.2986 | 9.8616 | 268 | 55.2 |
| 9025 | —0.1903 | —0.3814 | —0.1860 | 9.6676 | 245 | 56.9 | +0.0862 | —0.6562 | —0.3019 | 9.8618 | 276 | 50.6 |
| 9030 | —0.0844 | 0.4074 | 0.2107 | 9.6687 | 259 | 44.9 | 0.1848 | 0.6370 | 0.2995 | 9.8620 | 284 | 45.6 |
| 9035 | +0.0278 | 0.4037 | 0.2200 | 9.6633 | 273 | 41.1 | 0.2798 | 0.6057 | 0.2913 | 9.8622 | 292 | 40.2 |
| 9040 | 0.1377 | 0.3694 | 0.2127 | 9.6513 | 288 | 11.6 | 0.3695 | 0.5627 | 0.2775 | 9.8622 | 300 | 34.6 |
| 9045 | 0.2359 | 0.3049 | 0.1880 | 9.6326 | 303 | 45.9 | 0.4521 | 0.5090 | 0.2585 | 9.8623 | 308 | 28.7 |
| 9050 | +0.3125 | —0.2122 | —0.1457 | 9.6073 | 321 | 0.3 | +0.5261 | —0.4456 | —0.2345 | 9.8623 | 316 | 22.9 |
| 9055 | 0.3537 | —0.0962 | 0.0875 | 9.5762 | 340 | 38.8 | 0.5900 | 0.3736 | 0.2060 | 9.8622 | 324 | 17.2 |
| 9060 | 0.3463 | +0.0323 | —0.0176 | 9.5419 | 3 | 31.3 | 0.6426 | 0.2945 | 0.1735 | 9.8621 | 332 | 11.7 |
| 9065 | 0.2791 | 0.1544 | +0.0549 | 9.5101 | 30 | 14.3 | 0.6829 | 0.2097 | 0.1378 | 9.8619 | 340 | 6.6 |
| 9070 | 0.1530 | 0.2428 | 0.1152 | 9.4903 | 60 | 25.5 | 0.7101 | 0.1209 | 0.0994 | 9.8616 | 348 | 1.9 |
| 9075 | +0.0097 | +0.2722 | +0.1475 | 9.4910 | 92 | 1.1 | +0.7237 | —0.0298 | —0.0590 | 9.8614 | 355 | 57.8 |
| 9080 | —0.1706 | 0.2360 | 0.1442 | 9.5119 | 122 | 1.5 | 0.7233 | +0.0618 | —0.0176 | 9.8610 | 3 | 54.3 |
| 9085 | 0.2966 | 0.1496 | 0.1104 | 9.5441 | 148 | 29.3 | 0.7090 | 0.1523 | +0.0242 | 9.8607 | 11 | 51.5 |
| 9090 | 0.3725 | +0.0369 | +0.0575 | 9.5784 | 171 | 7.9 | 0.6810 | 0.2399 | 0.0655 | 9.8603 | 19 | 49.6 |
| 9095 | 0.3981 | —0.0823 | —0.0041 | 9.6091 | 190 | 35.7 | 0.6398 | 0.3228 | 0.1056 | 9.8599 | 27 | 48.5 |
| 9100 | —0.3804 | —0.1011 | —0.0644 | 9.6340 | 207 | 42.3 | +0.5861 | +0.3994 | +0.1436 | 9.8595 | 35 | 48.3 |
| 9105 | 0.3272 | 0.2834 | 0.1194 | 9.6522 | 223 | 11.5 | 0.5210 | 0.4682 | 0.1788 | 9.8591 | 43 | 49.0 |
| 9110 | 0.2472 | 0.3527 | 0.1648 | 9.6638 | 237 | 39.1 | 0.4458 | 0.5279 | 0.2105 | 9.8587 | 51 | 50.6 |
| 9115 | 0.1486 | 0.3955 | 0.1978 | 9.6688 | 251 | 34.0 | 0.3618 | 0.5772 | 0.2380 | 9.8583 | 59 | 53.1 |
| 9120 | —0.0391 | 0.4095 | 0.2164 | 9.6673 | 265 | 22.3 | 0.2706 | 0.6152 | 0.2609 | 9.8579 | 67 | 56.5 |
| 9125 | +0.8732 | —0.3934 | —0.2191 | 9.6592 | 279 | 29.2 | +0.1742 | +0.6411 | +0.2787 | 9.8576 | 76 | 0.7 |
| 9130 | 0.1797 | 0.3468 | 0.2048 | 9.6445 | 294 | 21.7 | +0.0743 | 0.6543 | 0.2909 | 9.8573 | 84 | 5.6 |
| 9135 | 0.2706 | 0.2705 | 0.1729 | 9.6231 | 310 | 31.8 | —0.0271 | 0.6545 | 0.2974 | 9.8570 | 92 | 11.2 |
| 9140 | 0.3342 | 0.1675 | 0.1239 | 9.5953 | 328 | 38.9 | 0.1279 | 0.6417 | 0.2980 | 9.8568 | 100 | 17.3 |
| 9145 | 0.3573 | —0.0447 | —0.0601 | 9.5624 | 349 | 30.4 | 0.2262 | 0.6162 | 0.2927 | 9.8566 | 108 | 23.9 |
| 9150 | +0.3266 | +0.0841 | +0.0122 | 9.5282 | 13 | 54.3 | —0.3200 | +0.5785 | +0.2815 | 9.8564 | 116 | 30.9 |
| 9155 | 0.2343 | 0.1960 | 0.0818 | 9.5000 | 42 | 9.6 | 0.4074 | 0.5292 | 0.2648 | 9.8564 | 124 | 38.0 |
| 9160 | +0.0893 | 0.2628 | 0.1324 | 9.4879 | 73 | 15.6 | 0.4867 | 0.4693 | 0.2427 | 9.8564 | 132 | 45.3 |
| 9165 | —0.0776 | 0.2650 | 0.1504 | 9.4975 | 104 | 33.6 | 0.5563 | 0.4002 | 0.2159 | 9.8564 | 140 | 52.5 |
| 9170 | 0.2273 | 0.2056 | 0.1336 | 9.5242 | 133 | 15.3 | 0.6148 | 0.3231 | 0.1847 | 9.8565 | 148 | 59.5 |
| 9175 | —0.3337 | +0.1057 | +0.0906 | 9.5582 | 158 | 7.4 | —0.6611 | +0.2396 | +0.1499 | 9.8567 | 157 | 6.2 |
| 9180 | 0.3888 | +0.0114 | +0.0332 | 9.5915 | 179 | 22.6 | 0.6942 | 0.1512 | 0.1120 | 9.8569 | 165 | 12.5 |
| 9185 | 0.3959 | —0.1275 | —0.0286 | 9.6200 | 197 | 47.3 | 0.7136 | +0.0599 | 0.0720 | 9.8572 | 173 | 18.2 |
| 9190 | 0.3626 | 0.2310 | 0.0877 | 9.6422 | 214 | 9.3 | 0.7189 | —0.0326 | +0.0305 | 9.8575 | 181 | 23.3 |
| 9195 | 0.2975 | 0.3146 | 0.1392 | 9.6578 | 220 | 9.8 | 0.7099 | 0.1245 | —0.0115 | 9.8578 | 189 | 27.4 |
| 9200 | —0.2089 | —0.3734 | —0.1798 | 9.6667 | 243 | 20.7 | —0.6869 | —0.2139 | —0.0534 | 9.8582 | 197 | 31.3 |
| 9205 | —0.1049 | 0.4043 | 0.2072 | 9.6690 | 257 | 9.9 | 0.6505 | 0.2991 | 0.0942 | 9.8586 | 205 | 34.0 |
| 9210 | +0.0067 | 0.4067 | 0.2195 | 9.6648 | 271 | 2.8 | 0.6012 | 0.3784 | 0.1331 | 9.8590 | 213 | 35.8 |
| 9215 | 0.1177 | 0.3782 | 0.2154 | 9.6540 | 285 | 24.7 | 0.5402 | 0.4504 | 0.1695 | 9.8594 | 221 | 36.7 |
| 9220 | 0.2191 | 0.3193 | 0.1939 | 9.6366 | 300 | 44.5 | 0.4687 | 0.5135 | 0.2025 | 9.8598 | 229 | 36.7 |
| 9225 | +0.3005 | —0.2316 | —0.1549 | 9.6125 | 317 | 36.9 | —0.3881 | —0.5667 | —0.2316 | 9.8602 | 237 | 35.8 |
| 9230 | 0.3493 | —0.1194 | 0.0995 | 9.5824 | 336 | 44.7 | 0.2999 | 0.6089 | 0.2562 | 9.8606 | 245 | 34.1 |
| 9235 | 0.3520 | +0.0080 | —0.0313 | 9.5484 | 358 | 57.2 | 0.2059 | 0.6393 | 0.2759 | 9.8610 | 253 | 31.5 |
| 9240 | 0.2965 | 0.1332 | +0.0417 | 9.5155 | 24 | 56.0 | 0.1079 | 0.6573 | 0.2902 | 9.8613 | 261 | 28.2 |
| 9245 | +0.1805 | +0.2301 | +0.1056 | 9.4926 | 54 | 34.4 | —0.0079 | —0.6627 | —0.2990 | 9.8616 | 369 | 24.2 |

| | MERCURY. | | | | | VENUS. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. |
| 239 | | | | | ° ′ | | | | | ° ′ |
| 9250 | +0.0219 | +0.2719 | +0.1441 | 9.4842 | 86 7.8 | +0.0923 | −0.6554 | −0.3020 | 9.8618 | 277 19.6 |
| 9255 | 0.1424 | 0.2473 | 0.1474 | 9.5068 | 116 58.3 | 0.1907 | 0.6355 | 0.2992 | 9.8620 | 285 14.6 |
| 9260 | 0.2766 | 0.1685 | 0.1186 | 9.5377 | 143 49.9 | 0.2855 | 0.6034 | 0.2906 | 9.8622 | 293 9.2 |
| 9265 | 0.3623 | +0.0590 | 0.0683 | 9.5721 | 167 9.5 | 0.3748 | 0.5598 | 0.2765 | 9.8622 | 301 3.5 |
| 9270 | 0.3971 | −0.0595 | +0.0081 | 9.6038 | 187 9.3 | 0.4569 | 0.5054 | 0.2571 | 9.8623 | 308 57.7 |
| 9275 | +0.3867 | −0.1716 | −0.0533 | 9.6298 | 204 38.9 | +0.5303 | −0.4414 | −0.2328 | 9.8623 | 316 51.8 |
| 9280 | 0.3394 | 0.2677 | 0.1097 | 9.6493 | 220 23.3 | 0.5935 | 0.3690 | 0.2041 | 9.8622 | 324 46.1 |
| 9285 | 0.2638 | 0.3416 | 0.1571 | 9.6622 | 234 59.9 | 0.6454 | 0.2895 | 0.1714 | 9.8620 | 332 40.7 |
| 9290 | +0.1681 | 0.3896 | 0.1926 | 9.6684 | 248 59.0 | 0.6849 | 0.2044 | 0.1355 | 9.8619 | 340 35.6 |
| 9295 | −0.0600 | 0.4091 | 0.2141 | 9.6680 | 262 46.7 | 0.7113 | 0.1154 | 0.0969 | 9.8616 | 348 30.9 |
| 9300 | +0.0524 | −0.3988 | −0.2198 | 9.6612 | 276 48.1 | +0.7240 | −0.0242 | −0.0565 | 9.8613 | 356 26.8 |
| 9305 | 0.1607 | 0.3579 | 0.2088 | 9.6478 | 291 29.8 | 0.7228 | +0.0674 | −0.0150 | 9.8610 | 4 23.4 |
| 9310 | 0.2553 | 0.2870 | 0.1802 | 9.6276 | 307 22.6 | 0.7077 | 0.1578 | +0.0267 | 9.8607 | 12 20.7 |
| 9315 | +0.3250 | −0.1886 | −0.1343 | 9.6010 | 325 4.3 | +0.6785 | +0.2451 | +0.0680 | 9.8603 | 20 18.8 |

| | MARS. | | | | | JUPITER. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. |
| 239 | | | | | ° ′ | | | | | ° ′ ″ |
| 8950 | −1.4736 | +0.6891 | +0.3564 | 0.2216 | 152 16.0 | +4.67498 | −1.55319 | −0.78259 | 0.69793 | 339 38 0 |
| 8960 | 1.5283 | 0.5854 | 0.3097 | 0.2215 | 156 37.7 | 4.69998 | 1.48440 | 0.75364 | 0.69776 | 340 32 13 |
| 8970 | 1.5729 | 0.4768 | 0.2610 | 0.2211 | 160 59.9 | 4.72385 | 1.41528 | 0.72452 | 0.69760 | 341 26 28 |
| 8980 | 1.6076 | 0.3655 | 0.2108 | 0.2206 | 165 22.8 | 4.74659 | 1.34583 | 0.69523 | 0.69744 | 342 20 45 |
| 8990 | 1.6318 | 0.2515 | 0.1591 | 0.2198 | 169 46.8 | 4.76818 | 1.27606 | 0.66578 | 0 69729 | 343 15 5 |
| 9000 | −1.6457 | +0.1362 | +0.1063 | 0.2187 | 174 11.1 | +4.78863 | −1.20598 | −0.63617 | 0.69714 | 344 9 28 |
| 9010 | 1.6486 | +0.0199 | +0.0529 | 0.2173 | 178 37.3 | 4.80793 | 1.13562 | 0.60640 | 0.69699 | 345 3 52 |
| 9020 | 1.6408 | −0.0966 | −0.0008 | 0.2158 | 183 5.5 | 4.82608 | 1.06499 | 0.57649 | 0.69685 | 345 58 18 |
| 9030 | 1.6221 | 0.2124 | 0.0545 | 0.2140 | 187 35.7 | 4.84306 | 0.99410 | 0.54644 | 0.69672 | 346 52 47 |
| 9040 | 1.5921 | 0.3269 | 0.1079 | 0.2119 | 192 8.3 | 4.85888 | 0.92297 | 0.51626 | 0.69659 | 347 47 18 |
| 9050 | −1.5516 | −0.4388 | −0.1604 | 0.2096 | 196 43.6 | +4.87352 | −0.85161 | −0.48596 | 0.69646 | 348 41 51 |
| 9060 | 1.5001 | 0.5480 | 0.2120 | 0.2071 | 201 22.6 | 4.88699 | 0.78005 | 0.45554 | 0.69634 | 349 36 26 |
| 9070 | 1.4380 | 0.6533 | 0.2620 | 0.2044 | 206 3.9 | 4.89927 | 0.70830 | 0.42500 | 0.69622 | 350 31 2 |
| 9080 | 1.3656 | 0.7541 | 0.3101 | 0.2015 | 210 49.3 | 4.91037 | 0.63637 | 0.39436 | 0.69610 | 351 25 40 |
| 9090 | 1.2832 | 0.8486 | 0.3559 | 0.1984 | 215 38.7 | 4.92028 | 0.56429 | 0.36362 | 0.69599 | 352 20 20 |
| 9100 | −1.1910 | −0.9373 | −0.3992 | 0.1952 | 220 32.4 | +4.92901 | −0.49207 | −0.33279 | 0.69589 | 353 15 1 |
| 9110 | 1.0898 | 1.0186 | 0.4393 | 0.1918 | 225 30.5 | 4.93654 | 0.41973 | 0.30188 | 0.69579 | 354 9 44 |
| 9120 | 0.9800 | 1.0920 | 0.4759 | 0.1883 | 230 33.7 | 4.94288 | 0.34728 | 0.27091 | 0.69570 | 355 4 28 |
| 9130 | 0.8623 | 1.1566 | 0.5087 | 0.1847 | 235 41.7 | 4.94801 | 0.27475 | 0.23987 | 0.69561 | 355 59 14 |
| 9140 | 0.7375 | 1.2116 | 0.5373 | 0.1810 | 240 55.3 | 4.95194 | 0.20215 | 0.20877 | 0.69552 | 356 54 1 |
| 9150 | −0.6064 | −1.2563 | −0.5613 | 0.1772 | 246 13.7 | +4.95467 | −0.12950 | −0.17761 | 0.69544 | 357 48 49 |
| 9160 | 0.4700 | 1.2901 | 0.5805 | 0.1734 | 252 38.0 | 4.95619 | −0.05683 | 0.14641 | 0.69537 | 358 43 39 |
| 9170 | 0.3295 | 1.3122 | 0.5946 | 0.1697 | 257 7.8 | 4.95651 | +0.01585 | 0.11518 | 0.69530 | 359 38 30 |
| 9180 | 0.1859 | 1.3224 | 0.6031 | 0.1660 | 262 43.7 | 4.95562 | 0.08853 | 0.08392 | 0.69523 | 0 33 22 |
| 9190 | −0.0406 | 1.3202 | 0.6059 | 0.1624 | 268 24.9 | 4.95353 | 0.16119 | 0.05264 | 0.69517 | 1 28 14 |
| 9200 | +0.1051 | −1.3054 | −0.6029 | 0.1590 | 274 11.9 | +4.95024 | +0.23380 | −0.02136 | 0.69511 | 2 23 8 |
| 9210 | 0.2497 | 1.2775 | 0.5940 | 0.1556 | 280 4.2 | 4.94574 | 0.30635 | +0.00993 | 0.69506 | 3 18 2 |
| 9220 | 0.3919 | 1.2370 | 0.5791 | 0.1526 | 286 1.8 | 4.94004 | 0.37883 | 0.04122 | 0.69502 | 4 12 57 |
| 9230 | 0.5300 | 1.1834 | 0.5581 | 0.1498 | 292 4.2 | 4.93313 | 0.45121 | 0.07250 | 0.69498 | 5 7 53 |
| 9240 | 0.6624 | 1.1176 | 0.5314 | 0.1473 | 298 11.1 | 4.92502 | 0.52349 | 0.10377 | 0.69494 | 6 2 49 |
| 9250 | +0.7877 | −1.0398 | −0.4989 | 0.1451 | 304 21.8 | +4.91570 | +0.59564 | +0.13501 | 0.69491 | 6 57 46 |
| 9260 | 0.9046 | 0.9508 | 0.4611 | 0.1433 | 310 35.4 | 4.90518 | 0.66765 | 0.16622 | 0.69488 | 7 52 43 |
| 9270 | 1.0116 | 0.8512 | 0.4182 | 0.1420 | 316 53.0 | 4.89347 | 0.73950 | 0.19739 | 0.69486 | 8 47 41 |
| 9280 | 1.1072 | 0.7421 | 0.3706 | 0.1410 | 323 12.0 | 4.88056 | 0.81118 | 0.22850 | 0.69485 | 9 42 39 |
| 9290 | 1.1906 | 0.6249 | 0.3189 | 0.1405 | 329 32.1 | 4.86646 | 0.88266 | 0.25956 | 0.69484 | 10 37 37 |
| 9300 | 1.2606 | 0.5006 | 0.2637 | 0.1404 | 335 52.9 | 4.85118 | 0.95393 | 0.29056 | 0.69483 | 11 32 35 |
| 9310 | 1.3167 | −0.3707 | −0.2055 | 0.1408 | 342 13.6 | 4.83471 | 1.02496 | 0.32150 | 0.69483 | 12 27 33 |
| | | | | | | +4.81705 | +1.09575 | +0.35236 | 0.69484 | 13 22 32 |

## SATURN.

| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. |
|---|---|---|---|---|---|
| 239 | | | | | ° ′ ″ |
| 8980 | +0.28403 | +8.32533 | +3.43758 | 0.95480 | 88 10 25 |
| 9000 | 0.16623 | 8.32610 | 3.44304 | 0.95479 | 88 55 24 |
| 9020 | +0.04842 | 8.32552 | 3.44793 | 0.95479 | 89 40 24 |
| 9040 | —0.06940 | 8.32359 | 3.45229 | 0.95479 | 90 25 23 |
| 9060 | 0.18721 | 8.32032 | 3.45607 | 0.95479 | 91 10 23 |
| 9080 | —0.30502 | +8.31570 | +3.45928 | 0.95480 | 91 55 22 |
| 9100 | 0.42281 | 8.30973 | 3.46191 | 0.95482 | 92 40 21 |
| 9120 | 0.54056 | 8.30242 | 3.46399 | 0.95484 | 93 25 21 |
| 9140 | 0.65823 | 8.29376 | 3.46552 | 0.95486 | 94 10 20 |
| 9160 | 0.77578 | 8.28373 | 3.46651 | 0.95488 | 94 55 20 |
| 9180 | —0.89318 | +8.27236 | +3.46693 | 0.95491 | 95 40 19 |
| 9200 | 1.01041 | 8.25966 | 3.46678 | 0.95494 | 96 25 17 |
| 9220 | 1.12747 | 8.24563 | 3.46608 | 0.95498 | 97 10 16 |
| 9240 | 1.24438 | 8.23026 | 3.46479 | 0.95502 | 97 55 14 |
| 9260 | 1.36111 | 8.21357 | 3.46295 | 0.95506 | 98 40 12 |
| 9280 | —1.47765 | +8.19553 | +3.46053 | 0.95511 | 99 25 9 |
| 9300 | 1.59396 | 8.17617 | 3.45754 | 0.95516 | 100 10 6 |
| 9320 | 1.71003 | 8.15547 | 3.45397 | 0.95522 | 100 55 2 |
| 9340 | —1.82586 | +8.13343 | +3.44982 | 0.95529 | 101 39 8 |

## URANUS.

| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. |
|---|---|---|---|---|---|
| 239 | | | | | ° ′ ″ |
| 8980 | +12.67544 | +13.76185 | +5 85754 | 1.29237 | 49 43 5 |
| 9000 | 12.61435 | 13.80445 | 5.87739 | 1.29230 | 49 56 38 |
| 9020 | 12.55309 | 13.84731 | 5.89713 | 1.29223 | 50 10 11 |
| 9040 | 12.49164 | 13.88999 | 5.91674 | 1.29216 | 50 23 45 |
| 9060 | 12.42997 | 13.93242 | 5.93624 | 1.29209 | 50 37 18 |
| 9080 | +12.36806 | +13.97466 | +5.95565 | 1.29202 | 50 50 52 |
| 9100 | 12.30591 | 14.01674 | 5.97508 | 1.29195 | 51 4 28 |
| 9120 | 12.24353 | 14.05858 | 5.99423 | 1.29188 | 51 18 1 |
| 9140 | 12.18096 | 14.10022 | 6.01340 | 1.29181 | 51 31 37 |
| 9160 | 12.11822 | 14.14189 | 6.03249 | 1.29174 | 51 45 12 |
| 9180 | +12.05531 | +14.18273 | +6.05149 | 1.29166 | 51 58 47 |
| 9200 | 11.99225 | 14.22361 | 6.07037 | 1.29159 | 52 12 23 |
| 9220 | 11.92900 | 14.26426 | 6.08913 | 1.29152 | 52 25 59 |
| 9240 | 11.86556 | 14.30468 | 6.10779 | 1.29145 | 52 39 36 |
| 9260 | 11.80191 | 14.34491 | 6.12632 | 1.29137 | 52 53 13 |
| 9280 | +11.73804 | +14.38491 | +6.14476 | 1.29130 | 53 6 50 |
| 9300 | 11.67393 | 14.42473 | 6.16315 | 1.29123 | 53 20 27 |
| 9320 | 11.60949 | 14.46432 | 6.18147 | 1.29116 | 53 34 5 |
| 9340 | +11.54472 | +14.50476 | +6.19972 | 1.29109 | 53 47 43 |

## NEPTUNE.

| Days fr. begin'g of Julian Period. | X. | Y. | Z. | Log. of Rad. Vect. | Longitude in Orbit. |
|---|---|---|---|---|---|
| 239 | | | | | ° ′ |
| 8960 | +29.2122 | —5.6962 | —3.0879 | 1.47599 | 347 33.2 |
| 9000 | 29.2384 | 5.5807 | 3.0411 | 1.47598 | 347 47.9 |
| 9040 | 29.2640 | 5.4652 | 2.9944 | 1.47596 | 348 2.5 |
| 9080 | 29.2891 | 5.3496 | 2.9476 | 1.47595 | 348 17.2 |
| 9120 | 29.3137 | 5.2336 | 2.9006 | 1.47593 | 348 31.7 |
| 9160 | +29.3377 | —5.1175 | —2.8536 | 1.47592 | 348 46.4 |
| 9200 | 29.3611 | 5.0016 | 2.8066 | 1.47590 | 349 1.0 |
| 9240 | 29.3840 | 4.8857 | 2.7596 | 1.47589 | 349 15.6 |
| 9280 | 29.4064 | 4.7695 | 2.7125 | 1.47587 | 349 30.3 |
| 9320 | +29.4283 | —4.6530 | —2.6652 | 1.47586 | 349 44.9 |

## INCLINATIONS AND NODES.

### For Julian Date 2399000.

| Planets. | Inclination. | Increase in 100 days. | Longitude of Ascending Node. | Incr in 100 Days. |
|---|---|---|---|---|
| | ° ′ ″ | ″ | ° ′ ″ | ″ |
| Mercury | 7 1 8.6 | +0.01947 | 14 37 25 | 11.469 |
| Venus | 3 31 21.8 | +0.01232 | 75 24 3 | 9.004 |
| Mars | 1 51 2.2 | —0.00611 | 48 26 25 | 7.600 |
| Jupiter | 1 18 40.1 | —0.05632 | 98 59 53 | 9.990 |
| Saturn | 2 29 28.1 | —0.03768 | 112 25 23 | 8.566 |
| Uranus | 0 46 29.7 | +0.00834 | 73 16 5 | 4.898 |
| Neptune | 1 46 59.0 | | 130 11 40 | |

## LOGARITHMS OF MASSES.

Sun's = 1.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mercury, | 93.3129 | The Earth, | 94.44812 | Jupiter, | 96 979689 | Uranus, | 95.60371 |
| Venus, | 94.4089 | Mars, | 93 57176 | Saturn, | 96.45573 | Neptune, | 95.72670 |

# ECLIPSES IN 1856.

In the year 1856 there will be four Eclipses; two of the Sun and two of the Moon; viz.: —

I. A Total Eclipse of the Sun, April 4, 1856, invisible at Washington, with the following elements.

Washington Mean Time of ☌ in Right Ascension, April $\overset{d.}{4}$ $\overset{h.}{12}$ $\overset{m.}{8}$ $\overset{s.}{55.5}$.

| | | | |
|---|---|---|---|
| | h. m s. | | s. s. |
| Sun's and Moon's R.A. | 0 57 31.20 | Hourly Motions | 9.13 and 134.59 |
| | ° ′ ″ | | ′ ″ |
| Sun's Declination | + 6 9 5.5 | Hourly Motion | + 0 56.9 |
| Moon's Declination | + 5 14 18.8 | Hourly Motion | +17 44.7 |
| Moon's Longitude | 15 15 46.3 | Hourly Motion | 37 45.8 |
| Moon's Latitude | — 0 50 33.0 | Hourly Motion | + 3 26.8 |
| Sun's Equa. Hor. Par. | 8.6 | True Semidiameter | 16 0.8 |
| Moon's Equa. Hor. Par. | 61 10.0 | True Semidiameter | 16 39.2 |

From these elements may be deduced the following results: —

Eclipse begins on the Earth, April $4^{d.}$ $10^{h.}$ $37.2^{m.}$, Washington mean time, in longitude 238° 25′ West of Washington, and latitude 58° 56′ South.

Central Eclipse begins, $11^{h.}$ $50.0^{m.}$, in longitude 233° 37′ West of Washington, and latitude 78° 57′ South.

Central Eclipse at noon, $12^{h.}$ $8.9^{m.}$, in longitude 181° 33′ West of Washington, and latitude 58° 5′ South.

Central Eclipse ends, $13^{h.}$ $56.0^{m.}$, in longitude 121° 4′ West of Washington, and latitude 24° 0′ South.

Eclipse ends on the Earth, $15^{h.}$ $8.7^{m.}$, in longitude 136° 48′ West of Washington, and latitude 2° 45′ South.

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

| Wash. M. Time. |  | A. | B. | C. | log E. | log F. | log G. | log H. | μ |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| h. | m. |  |  |  | 9.997 | 9.997 | 9.00 | 9.04 | ° | ′ | ″ |
| 10 | 35 | —0.80082 | —0.79307 | —1.86193 | 727 | 292 | 9198 | 6989 | 158 | 3 | 30.1 |
| 10 | 40 | 0.75819 | 0.77015 | 1.83903 | 727 | 291 | 9291 | 7074 | 159 | 18 | 31.4 |
| 10 | 45 | 0.71557 | 0.74724 | 1.81613 | 726 | 290 | 9384 | 7160 | 160 | 33 | 32.6 |
| 10 | 50 | 0.67294 | 0.72433 | 1.79324 | 725 | 289 | 9478 | 7245 | 161 | 48 | 33.9 |
| 10 | 55 | 0.63031 | 0.70141 | 1.77034 | 724 | 288 | 9571 | 7330 | 163 | 3 | 35.2 |
| 11 | 0 | 0.58768 | 0.67850 | 1.74744 | 723 | 286 | 9664 | 7416 | 164 | 18 | 36.5 |
| 11 | 5 | 0.54505 | 0.65559 | 1.72454 | 722 | 285 | 9757 | 7501 | 165 | 33 | 37.8 |
| 11 | 10 | 0.50242 | 0.63267 | 1.70164 | 721 | 284 | 9850 | 7586 | 166 | 48 | 39.0 |
| 11 | 15 | 0.45979 | 0.60976 | 1.67874 | 720 | 283 | 9943 | 7672 | 168 | 3 | 40.3 |
| 11 | 20 | 0.41716 | 0.58685 | 1.65584 | 719 | 282 | *036 | 7757 | 169 | 18 | 41.6 |
| 11 | 25 | 0.37453 | 0.56393 | 1.63294 | 718 | 281 | 0130 | 7842 | 170 | 33 | 42.9 |
| 11 | 30 | 0.33189 | 0.54102 | 1.61004 | 717 | 280 | 0223 | 7927 | 171 | 48 | 44.2 |
| 11 | 35 | 0.28926 | 0.51811 | 1.58714 | 716 | 279 | 0316 | 8013 | 173 | 3 | 45.4 |
| 11 | 40 | 0.24663 | 0.49519 | 1.56424 | 715 | 278 | 0409 | 8098 | 174 | 18 | 46.7 |
| 11 | 45 | 0.20400 | 0.47228 | 1.54134 | 714 | 277 | 0502 | 8183 | 175 | 33 | 48.0 |
| 11 | 50 | 0.16137 | 0.44937 | 1.51844 | 713 | 276 | 0594 | 8268 | 176 | 48 | 49.3 |
| 11 | 55 | 0.11873 | 0.42645 | 1.49553 | 712 | 275 | 0687 | 8353 | 178 | 3 | 50.6 |
| 12 | 0 | 0.07610 | 0.40354 | 1.47263 | 711 | 274 | 0780 | 8438 | 179 | 18 | 51.8 |
| 12 | 5 | —0.03347 | 0.38063 | 1.44973 | 710 | 273 | 0873 | 8523 | 180 | 33 | 53.1 |
| 12 | 10 | +0.00917 | 0.35771 | 1.42683 | 709 | 271 | 0966 | 8608 | 181 | 48 | 54.4 |
| 12 | 15 | 0.05180 | 0.33480 | 1.40392 | 708 | 270 | 1059 | 8693 | 183 | 3 | 55.7 |
| 12 | 20 | 0.09443 | 0.31189 | 1.38102 | 707 | 269 | 1152 | 8778 | 184 | 18 | 56.9 |
| 12 | 25 | 0.13707 | 0.28897 | 1.35811 | 706 | 268 | 1244 | 8863 | 185 | 33 | 58.2 |
| 12 | 30 | 0.17970 | 0.26606 | 1.33521 | 705 | 267 | 1337 | 8948 | 186 | 48 | 59.5 |
| 12 | 35 | 0.22233 | 0.24315 | 1.31231 | 704 | 266 | 1430 | 9033 | 188 | 4 | 0.8 |
| 12 | 40 | 0.26496 | 0.22024 | 1.28940 | 703 | 265 | 1522 | 9118 | 189 | 19 | 2.1 |
| 12 | 45 | 0.30760 | 0.19732 | 1.26650 | 702 | 264 | 1615 | 9203 | 190 | 34 | 3.3 |
| 12 | 50 | 0.35023 | 0.17441 | 1.24359 | 701 | 263 | 1708 | 9288 | 191 | 49 | 4.6 |
| 12 | 55 | 0.39286 | 0.15150 | 1.22069 | 700 | 262 | 1800 | 9373 | 193 | 4 | 5.9 |
| 13 | 0 | 0.43549 | 0.12859 | 1.19778 | 699 | 261 | 1893 | 9458 | 194 | 19 | 7.2 |
| 13 | 5 | 0.47813 | 0.10568 | 1.17488 | 698 | 260 | 1986 | 9542 | 195 | 34 | 8.4 |
| 13 | 10 | 0.52076 | 0.08276 | 1.15197 | 697 | 259 | 2078 | 9627 | 196 | 49 | 9.7 |
| 13 | 15 | 0.56339 | 0.05985 | 1.12906 | 696 | 257 | 2171 | 9712 | 198 | 4 | 11.0 |
| 13 | 20 | 0.60602 | 0.03694 | 1.10616 | 695 | 256 | 2263 | 9797 | 199 | 19 | 12.3 |
| 13 | 25 | 0.64865 | —0.01403 | 1.08325 | 694 | 255 | 2356 | 9881 | 200 | 34 | 13.6 |
| 13 | 30 | 0.69128 | +0.00888 | 1.06034 | 693 | 254 | 2448 | 9966 | 201 | 49 | 14.8 |
| 13 | 35 | 0.73392 | 0.03179 | 1.03744 | 692 | 253 | 2540 | *051 | 203 | 4 | 16.1 |
| 13 | 40 | 0.77655 | 0.05471 | 1.01453 | 691 | 252 | 2633 | 0136 | 204 | 19 | 17.4 |
| 13 | 45 | 0.81917 | 0.07762 | 0.99162 | 690 | 251 | 2725 | 0220 | 205 | 34 | 18.7 |
| 13 | 50 | 0.86180 | 0.10053 | 0.96872 | 689 | 250 | 2818 | 0305 | 206 | 49 | 20.0 |
| 13 | 55 | 0.90443 | 0.12344 | 0.94581 | 688 | 249 | 2910 | 0389 | 208 | 4 | 21.2 |
| 14 | 0 | 0.94706 | 0.14635 | 0.92290 | 687 | 248 | 3002 | 0474 | 209 | 19 | 22.5 |
| 14 | 5 | 0.98969 | 0.16926 | 0.89999 | 686 | 247 | 3095 | 0559 | 210 | 34 | 23.8 |
| 14 | 10 | 1.03232 | 0.19216 | 0.87709 | 685 | 246 | 3187 | 0643 | 211 | 49 | 25.1 |
| 14 | 15 | 1.07495 | 0.21507 | 0.85418 | 684 | 244 | 3279 | 0728 | 213 | 4 | 26.4 |
| 14 | 20 | 1.11757 | 0.23798 | 0.83127 | 683 | 243 | 3371 | 0812 | 214 | 19 | 27.6 |
| 14 | 25 | 1.16020 | 0.26089 | 0.80836 | 682 | 242 | 3463 | 0897 | 215 | 34 | 28.9 |
| 14 | 30 | 1.20282 | 0.28380 | 0.78546 | 681 | 241 | 3556 | 0981 | 216 | 49 | 30.2 |
| 14 | 35 | 1.24545 | 0.30671 | 0.76255 | 680 | 240 | 3648 | 1065 | 218 | 4 | 31.5 |
| 14 | 40 | 1.28807 | 0.32961 | 0.73964 | 679 | 239 | 3740 | 1150 | 219 | 19 | 32.7 |
| 14 | 45 | 1.33070 | 0.35252 | 0.71673 | 678 | 238 | 3832 | 1234 | 220 | 34 | 34.0 |
| 14 | 50 | 1.37332 | 0.37543 | 0.69383 | 677 | 237 | 3924 | 1319 | 221 | 49 | 35.3 |
| 14 | 55 | 1.41594 | 0.39833 | 0.67092 | 676 | 236 | 4016 | 1403 | 223 | 4 | 36.6 |
| 15 | 0 | 1.45856 | 0.42124 | 0.64801 | 675 | 235 | 4108 | 1487 | 224 | 19 | 37.9 |
| 15 | 5 | 1.50119 | 0.44415 | 0.62510 | 674 | 234 | 4200 | 1572 | 225 | 34 | 39.1 |
| 15 | 10 | +1.54381 | +0.46705 | —0.60219 | 673 | 233 | 4292 | 1656 | 226 | 49 | 40.4 |

### FOR SHADOW.

| Washington Mean Time. h. m. | B. | C. | Washington Mean Time. h. m. | B. | C. |
|---|---|---|---|---|---|
| 11 45 | —1.01809 | —0.99552 | 12 55 | —0.69731 | —0.67487 |
| 11 50 | 0.99518 | 0.97262 | 13 0 | 0.67440 | 0.65197 |
| 11 55 | 0.97227 | 0.94972 | 13 5 | 0.65149 | 0.62906 |
| 12 0 | 0.94935 | 0.92682 | 13 10 | 0.62858 | 0.60616 |
| 12 5 | 0.92644 | 0.90391 | 13 15 | 0.60567 | 0.58325 |
| 12 10 | 0.90353 | 0.88101 | 13 20 | 0.58275 | 0.56034 |
| 12 15 | 0.88061 | 0.85811 | 13 25 | 0.55984 | 0.53749 |
| 12 20 | 0.85770 | 0.83520 | 13 30 | 0.53693 | 0.51453 |
| 12 25 | 0.83479 | 0.81230 | 13 35 | 0.51402 | 0.49162 |
| 12 30 | 0.81187 | 0.78940 | 13 40 | 0.49111 | 0.46872 |
| 12 35 | 0.78896 | 0.76649 | 13 45 | 0.46820 | 0.44581 |
| 12 40 | 0.76605 | 0.74359 | 13 50 | 0.44529 | 0.42290 |
| 12 45 | 0.74314 | 0.72068 | 13 55 | 0.42238 | 0.39999 |
| 12 50 | —0.72022 | —0.69778 | 14 0 | —0.39947 | —0.37709 |

A, $\mu$, log E and log F are given in the Table for Penumbra, and the values of log G and log H are obtained from corresponding values for Penumbra by increasing log G by 0.000095, and decreasing log H by 0.000089.

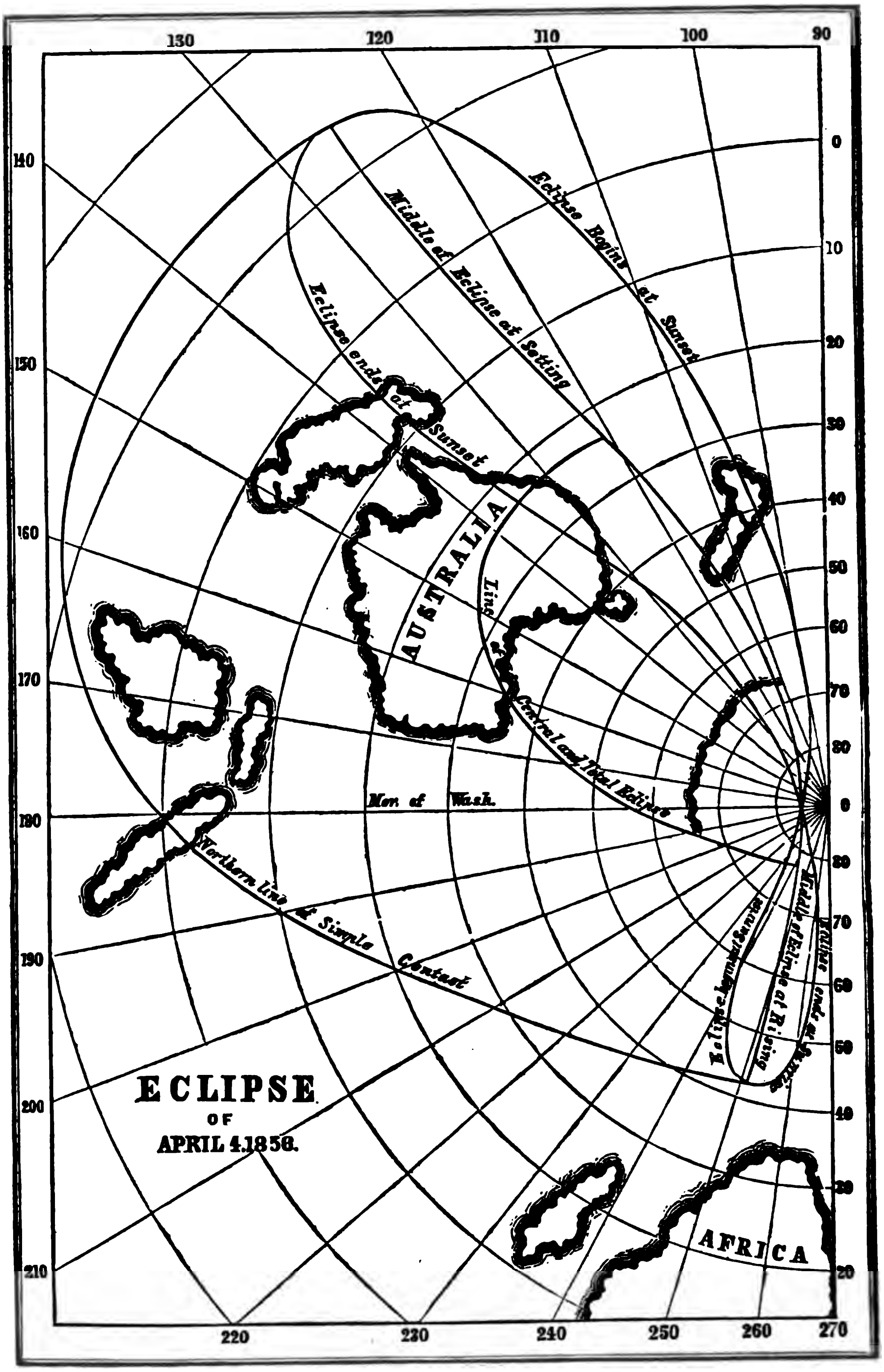
### CHANGES OF THE QUANTITIES IN THE TABLES OF DATA.

| Washington Mean Time. | For one Minute. | | | For one Second. | | |
|---|---|---|---|---|---|---|
| h. m. | A. | B. | C. | A'. | B'. | C'. |
| 10 35 | +8525.6 | +4582.6 | +4579.2 | +142.09 | +76.38 | +76.32 |
| 10 50 | 8525.8 | 4582.6 | 4579.6 | 142.10 | 76.38 | 76.33 |
| 11 5 | 8526.0 | 4582.6 | 4579.8 | 142.10 | 76.38 | 76.33 |
| 11 20 | 8526.2 | 4582.6 | 4580.0 | 142.10 | 76.38 | 76.33 |
| 11 35 | 8526.4 | 4582.6 | 4580.2 | 142.11 | 76.38 | 76.34 |
| 11 50 | 8526.5 | 4582.6 | 4580.4 | 142.11 | 76.38 | 76.34 |
| 12 5 | 8526.6 | 4582.6 | 4580.6 | 142.11 | 76.38 | 76.34 |
| 12 20 | 8526.6 | 4582.6 | 4580.8 | 142.11 | 76.38 | 76.35 |
| 12 35 | 8526.5 | 4582.6 | 4581.0 | 142.11 | 76.38 | 76.35 |
| 12 50 | 8526.4 | 4582.4 | 4581.0 | 142.11 | 76.37 | 76.35 |
| 13 5 | 8526.4 | 4582.4 | 4581.2 | 142.11 | 76.37 | 76.35 |
| 13 20 | 8526.2 | 4582.2 | 4581.4 | 142.10 | 76.37 | 76.36 |
| 13 35 | 8526.0 | 4582.2 | 4581.4 | 142.10 | 76.37 | 76.36 |
| 13 50 | 8525.8 | 4582.0 | 4581.5 | 142.10 | 76.37 | 76.36 |
| 14 5 | 8525.6 | 4581.8 | 4581.5 | 142.09 | 76.36 | 76.36 |
| 14 20 | 8525.2 | 4581.6 | 4581.6 | 142.09 | 76.36 | 76.36 |
| 14 35 | 8524.8 | 4581.4 | 4581.6 | 142.08 | 76.36 | 76.36 |
| 14 50 | 8524.4 | 4581.2 | 4581.6 | 142.07 | 76.35 | 76.36 |
| 15 5 | +8524.0 | +4581.0 | +4581.6 | +142.07 | +76.35 | +76.36 |

II. A Partial Eclipse of the Moon, April 19, 1856, with the following elements:—

Washington Mean Time of ☍ in Right Ascension, April 19d. 16h. 33m. 33s.8.

| | h. m. s. | | s. |
|---|---|---|---|
| Sun's Right Ascension | 1 53 27.41 | Hourly Motion | 9.32 |
| Moon's Right Ascension | 13 53 27.41 | " " | 111.65 |


130
120
110
100
90
140
150
160
170
180
190
200
210
220
230
240
250
260
270
0
10
20
30
40
50
60
70
80
0
80
70
60
50
40
30
20
Eclipse Begins at Sunset
Middle of Eclipse at Setting
Eclipse ends at Sunset
AUSTRALIA
Line of Central and Total Eclipse
Mer. of Wash.
Northern line of Simple Contact
Eclipse begins at Sunrise
Middle of Eclipse at Rising
Eclipse ends at Sunrise
AFRICA
ECLIPSE
OF
APRIL 4.1856.

| | ° ′ ″ | | ′ ″ |
|---|---|---|---|
| Sun's Declination | +11 38 58.5 | Hourly Motion | + 0 51.1 |
| Moon's Declination | —12 15 54.8 | " " | —13 9.5 |
| Moon's Longitude | 210 41 38.8 | " " | 30 8.5 |
| Moon's Latitude | — 0 34 33.9 | " " | — 2 46.4 |
| Sun's Equa. Hor. Par. | 8.5 | True Semidiameter | 15 56.8 |
| Moon's Equa. Hor. Par. | 54 33.7 | " " | 14 51.1 |

From these elements may be deduced the following results: —

| | h. m. | |
|---|---|---|
| Moon enters Penumbra | 13 7.0 | Washington Mean Time. |
| Moon enters Shadow | 14 25.8 | " " |
| Greatest Eclipse | 15 58.4 | " " |
| Moon leaves Shadow | 17 31.0 | " " |
| Moon leaves Penumbra | 18 49.8 | " " |

First contact of Shadow with Moon's limb 79° from north point towards the East.

Last contact of Shadow with Moon's limb 25° from north point towards the West.

Magnitude of Eclipse = 0.712 (Moon's diameter = 1).

Eclipse visible throughout North and South America and Australia, and in the eastern part of Asia.

Whole Eclipse visible in Kamtschatka, in the western part of South America, and throughout North America except the northeastern extremity.

III. An Annular Eclipse of the Sun, September 28, 1856, invisible at Washington, with the following elements: —

| | d. h. m. s. |
|---|---|
| Washington Mean Time of ☌ in Right Ascension, September | 28 9 48 58.6 |

| | h. m. s. | | s. s. |
|---|---|---|---|
| Sun's and Moon's R.A. | 12 22 32.69 | Hourly Motions | 9.04 and 104.09 |

| | ° ′ ″ | | ′ ″ |
|---|---|---|---|
| Sun's Declination | —2 26 25.8 | Hourly Motion | — 0 58.5 |
| Moon's Declination | —1 28 25.9 | " " | —14 9.3 |
| Moon's Longitude | 185 45 26.3 | " " | 29 29.8 |
| Moon's Latitude | +0 53 15.4 | " " | — 2 41.4 |
| Sun's Equa. Hor. Par. | 8.6 | True Semidiameter | 16 0.9 |
| Moon's Equa. Hor. Par. | 53 57.9 | " " | 14 41.6 |

From these elements may be deduced the following results: —

Eclipse begins on the Earth, September $28^{d.}$ $8^{h.}$ $22.3^{m.}$, mean time at Washington, in longitude 212° 34′ West of Washington, and latitude 66° 0′ North.

Central Eclipse begins, $10^{h.}$ $12.5^{m.}$, in longitude 79° 11′ West of Washington, and latitude 79° 47′ North.

Central Eclipse ends, $11^{h.}$ $30.4^{m.}$, in longitude 87° 13′ West of Washington, and latitude 41° 48′ North.

Eclipse ends on the Earth, $13^{h.}$ $20.3^{m.}$, in longitude 112° 52′ West of Washington, and latitude 7° 55′ North.

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

| Wash. M. Time. | | A. | B. | C. | log E. | log F. | log G. | log H. | μ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| h. | m. | | | | 9.9995 | 9.9996 | —8.6 | —8.5 | ° | ′ | ″ |
| 8 | 20 | —0.65446 | +2.01031 | +0.87075 | 27 | 98 | 7107 | 7465 | 127 | 25 | 0.1 |
| 8 | 25 | 0.61769 | 1.98992 | 0.85035 | 26 | 98 | 7128 | 7491 | 128 | 40 | 1.4 |
| 8 | 30 | 0.58091 | 1.96953 | 0.82995 | 26 | 98 | 7150 | 7517 | 129 | 55 | 2.8 |
| 8 | 35 | 0.54413 | 1.94915 | 0.80955 | 25 | 97 | 7171 | 7544 | 131 | 10 | 4.1 |
| 8 | 40 | 0.50736 | 1.92876 | 0.78916 | 25 | 97 | 7192 | 7570 | 132 | 25 | 5.4 |
| 8 | 45 | 0.47058 | 1.90837 | 0.76876 | 24 | 96 | 7213 | 7596 | 133 | 40 | 6.8 |
| 8 | 50 | 0.43381 | 1.88798 | 0.74836 | 24 | 96 | 7234 | 7622 | 134 | 55 | 8.1 |
| 8 | 55 | 0.39703 | 1.86759 | 0.72796 | 24 | 96 | 7255 | 7649 | 136 | 10 | 9.4 |
| 9 | 0 | 0.36025 | 1.84720 | 0.70756 | 23 | 95 | 7276 | 7675 | 137 | 25 | 10.8 |
| 9 | 5 | 0.32348 | 1.82681 | 0.68716 | 23 | 95 | 7297 | 7701 | 138 | 40 | 12.1 |
| 9 | 10 | 0.28670 | 1.80642 | 0.66676 | 22 | 95 | 7318 | 7727 | 139 | 55 | 13.4 |
| 9 | 15 | 0.24992 | 1.78603 | 0.64636 | 22 | 94 | 7339 | 7753 | 141 | 10 | 14.8 |
| 9 | 20 | 0.21314 | 1.76564 | 0.62596 | 21 | 94 | 7360 | 7780 | 142 | 25 | 16.1 |
| 9 | 25 | 0.17636 | 1.74524 | 0.60556 | 21 | 93 | 7381 | 7806 | 143 | 40 | 17.4 |
| 9 | 30 | 0.13959 | 1.72485 | 0.58515 | 20 | 93 | 7401 | 7832 | 144 | 55 | 18.8 |
| 9 | 35 | 0.10281 | 1.70445 | 0.56475 | 20 | 93 | 7422 | 7858 | 146 | 10 | 20.1 |
| 9 | 40 | 0.06603 | 1.68406 | 0.54435 | 19 | 92 | 7443 | 7884 | 147 | 25 | 21.4 |
| 9 | 45 | —0.02925 | 1.66366 | 0.52395 | 19 | 92 | 7464 | 7910 | 148 | 40 | 22.8 |
| 9 | 50 | +0.00753 | 1.64327 | 0.50354 | 18 | 92 | 7485 | 7936 | 149 | 55 | 24.1 |
| 9 | 55 | 0.04431 | 1.62287 | 0.48314 | 18 | 91 | 7506 | 7962 | 151 | 10 | 25.4 |
| 10 | 0 | 0.08109 | 1.60247 | 0.46274 | 17 | 91 | 7527 | 7988 | 152 | 25 | 26.8 |
| 10 | 5 | 0.11787 | 1.58207 | 0.44233 | 17 | 90 | 7548 | 8014 | 153 | 40 | 28.1 |
| 10 | 10 | 0.15465 | 1.56167 | 0.42193 | 17 | 90 | 7569 | 8040 | 154 | 55 | 29.4 |
| 10 | 15 | 0.19143 | 1.54128 | 0.40152 | 16 | 90 | 7589 | 8066 | 156 | 10 | 30.8 |
| 10 | 20 | 0.22820 | 1.52088 | 0.38112 | 16 | 89 | 7610 | 8092 | 157 | 25 | 32.1 |
| 10 | 25 | 0.26498 | 1.50048 | 0.36071 | 15 | 89 | 7631 | 8118 | 158 | 40 | 33.4 |
| 10 | 30 | 0.30176 | 1.48007 | 0.34031 | 15 | 89 | 7652 | 8144 | 159 | 55 | 34.8 |
| 10 | 35 | 0.33854 | 1.45967 | 0.31990 | 14 | 88 | 7673 | 8170 | 161 | 10 | 36.1 |
| 10 | 40 | 0.37532 | 1.43927 | 0.29950 | 14 | 88 | 7694 | 8196 | 162 | 25 | 37.4 |
| 10 | 45 | 0.41210 | 1.41887 | 0.27909 | 13 | 87 | 7714 | 8222 | 163 | 40 | 38.8 |
| 10 | 50 | 0.44888 | 1.39847 | 0.25868 | 13 | 87 | 7735 | 8248 | 164 | 55 | 40.1 |
| 10 | 55 | 0.48566 | 1.37806 | 0.23828 | 12 | 87 | 7756 | 8273 | 166 | 10 | 41.4 |
| 11 | 0 | 0.52244 | 1.35766 | 0.21787 | 12 | 86 | 7777 | 8299 | 167 | 25 | 42.8 |
| 11 | 5 | 0.55922 | 1.33726 | 0.19746 | 11 | 86 | 7797 | 8325 | 168 | 40 | 44.1 |
| 11 | 10 | 0.59599 | 1.31685 | 0.17706 | 11 | 86 | 7818 | 8351 | 169 | 55 | 45.4 |
| 11 | 15 | 0.63277 | 1.29645 | 0.15665 | 10 | 85 | 7839 | 8377 | 171 | 10 | 46.8 |
| 11 | 20 | 0.66955 | 1.27604 | 0.13624 | 10 | 85 | 7860 | 8402 | 172 | 25 | 48.1 |
| 11 | 25 | 0.70633 | 1.25564 | 0.11584 | 10 | 84 | 7880 | 8428 | 173 | 40 | 49.4 |
| 11 | 30 | 0.74311 | 1.23523 | 0.09543 | 09 | 84 | 7901 | 8454 | 174 | 55 | 50.8 |
| 11 | 35 | 0.77988 | 1.21482 | 0.07502 | 09 | 84 | 7922 | 8480 | 176 | 10 | 52.1 |
| 11 | 40 | 0.81666 | 1.19442 | 0.05461 | 08 | 83 | 7942 | 8505 | 177 | 25 | 53.4 |
| 11 | 45 | 0.85344 | 1.17401 | 0.03421 | 08 | 83 | 7963 | 8531 | 178 | 40 | 54.8 |
| 11 | 50 | 0.89022 | 1.15360 | +0.01380 | 07 | 83 | 7984 | 8557 | 179 | 55 | 56.1 |
| 11 | 55 | 0.92699 | 1.13319 | —0.00661 | 07 | 82 | 8004 | 8582 | 181 | 10 | 57.4 |
| 12 | 0 | 0.96377 | 1.11279 | 0.02702 | 06 | 82 | 8025 | 8608 | 182 | 25 | 58.8 |
| 12 | 5 | 1.00054 | 1.09238 | 0.04743 | 06 | 81 | 8046 | 8634 | 183 | 41 | 0.1 |
| 12 | 10 | 1.03732 | 1.07197 | 0.06783 | 05 | 81 | 8066 | 8659 | 184 | 56 | 1.4 |
| 12 | 15 | 1.07409 | 1.05156 | 0.08824 | 05 | 81 | 8087 | 8685 | 186 | 11 | 2.8 |
| 12 | 20 | 1.11087 | 1.03115 | 0.10865 | 04 | 80 | 8107 | 8710 | 187 | 26 | 4.1 |
| 12 | 25 | 1.14764 | 1.01074 | 0.12906 | 04 | 80 | 8128 | 8736 | 188 | 41 | 5.4 |
| 12 | 30 | 1.18442 | 0.99033 | 0.14947 | 03 | 79 | 8149 | 8762 | 189 | 56 | 6.7 |
| 12 | 35 | 1.22119 | 0.96992 | 0.16987 | 03 | 79 | 8169 | 8787 | 191 | 11 | 8.1 |
| 12 | 40 | 1.25796 | 0.94951 | 0.19028 | 02 | 79 | 8190 | 8813 | 192 | 26 | 9.4 |
| 12 | 45 | 1.29473 | 0.92910 | 0.21069 | 02 | 78 | 8210 | 8838 | 193 | 41 | 10.7 |
| 12 | 50 | 1.33151 | 0.90869 | 0.23110 | 01 | 78 | 8231 | 8864 | 194 | 56 | 12.1 |
| 12 | 55 | +1.36828 | +0.88828 | —0.25151 | 01 | 78 | 8251 | 8889 | 196 | 11 | 13.4 |

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

| Wash. M. Time. | A. | B. | C. | log E | log F. | log G. | log H. | μ |
|---|---|---|---|---|---|---|---|---|
| h. m. | | | | 9.9995 | 9.9996 | —8.6 | —8.5 | ° ′ ″ |
| 13 0 | +1.40505 | +0.86787 | —0.27191 | 00 | 77 | 8272 | 8915 | 197 26 14.7 |
| 13 5 | 1.44182 | 0.84746 | 0.29232 | 00 | 77 | 8292 | 8940 | 198 41 16.1 |
| 13 10 | 1.47859 | 0.82704 | 0.31273 | *0 | 76 | 8313 | 8965 | 199 56 17.4 |
| 13 15 | 1.51536 | 0.80663 | 0.33314 | 99 | 76 | 8333 | 8991 | 201 11 18.7 |
| 13 20 | 1.55213 | 0.78622 | 0.35355 | 99 | 76 | 8354 | 9016 | 202 26 20.1 |
| 13 25 | +1.58889 | +0.76581 | —0.37395 | 98 | 75 | 8374 | 9042 | 203 41 21.4 |

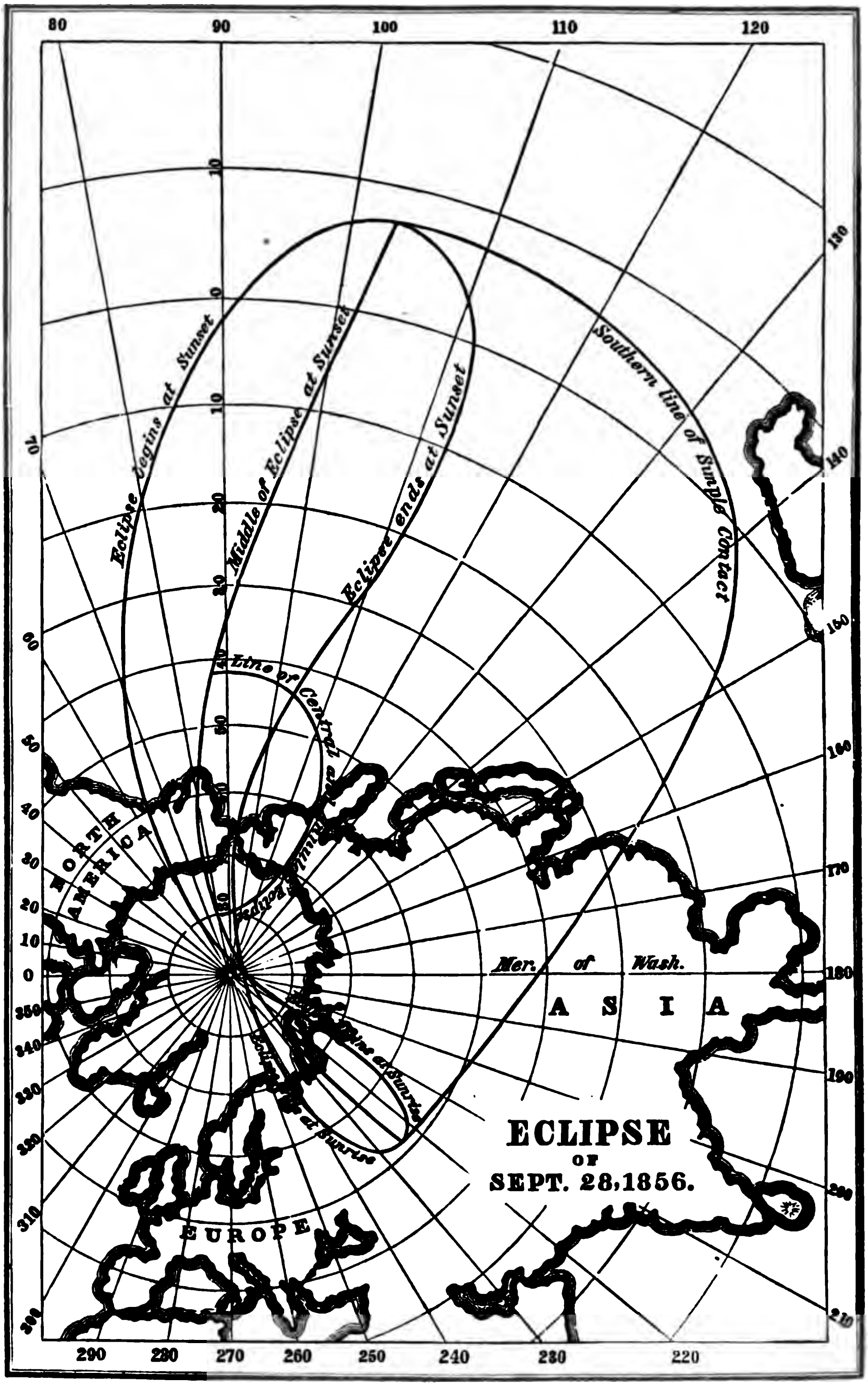
## FOR SHADOW.

| Washington Mean Time. | B. | C. | Washington Mean Time. | B. | C. |
|---|---|---|---|---|---|
| h. m. | | | h. m. | | |
| 10 0 | +1.05649 | +1.00872 | 10 50 | +0.85248 | +0.80467 |
| 10 5 | 1.03609 | 0.98832 | 10 55 | 0.83208 | 0.78426 |
| 10 10 | 1.01569 | 0.96791 | 11 0 | 0.81168 | 0.76386 |
| 10 15 | 0.99529 | 0.94751 | 11 5 | 0.79127 | 0.74345 |
| 10 20 | 0.97489 | 0.92710 | 11 10 | 0.77087 | 0.72304 |
| 10 25 | 0.95449 | 0.90670 | 11 15 | 0.75046 | 0.70263 |
| 10 30 | 0.93409 | 0.88629 | 11 20 | 0.73006 | 0.68223 |
| 10 35 | 0.91369 | 0.86589 | 11 25 | 0.70965 | 0.66182 |
| 10 40 | 0.89329 | 0.84548 | 11 30 | 0.68925 | 0.64141 |
| 10 45 | 0.87288 | 0.82507 | 11 35 | 0.66884 | 0.62101 |
| 10 50 | +0.85248 | +0.80467 | 11 40 | +0.64843 | +0.60060 |

A, μ, log E and log F are given in the Table for Penumbra, and the values of log G and log H for Shadow are obtained from corresponding values for Penumbra by decreasing log G by 0.00021, and increasing log H by 0.00026.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA.

| Washington Mean Time. | For one Minute. | | | For one Second. | | |
|---|---|---|---|---|---|---|
| | A. | B. | C. | A′. | B′. | C′. |
| h. m. | | | | | | |
| 8 20 | +7355.0 | —4077.0 | —4079.4 | +122.58 | —67.95 | —67.99 |
| 8 35 | 7355.2 | 4077.6 | 4079.6 | 122.59 | 67.96 | 67.99 |
| 8 50 | 7355.4 | 4077.8 | 4079.8 | 122.59 | 67.96 | 68.00 |
| 9 5 | 7355.4 | 4078.4 | 4080.2 | 122.59 | 67.97 | 68.00 |
| 9 20 | 7355.6 | 4078.6 | 4080.4 | 122.59 | 67.98 | 68.01 |
| 9 35 | 7355.8 | 4079.0 | 4080.6 | 122.60 | 67.98 | 68.01 |
| 9 50 | 7355.8 | 4079.4 | 4080.8 | 122.60 | 67.99 | 68.01 |
| 10 5 | 7355.8 | 4079.8 | 4081.0 | 122.60 | 68.00 | 68.02 |
| 10 20 | 7356.0 | 4080.0 | 4081.0 | 122.60 | 68.00 | 68.02 |
| 10 35 | 7355.8 | 4080.4 | 4081.2 | 122.60 | 68.01 | 68.02 |
| 10 50 | 7355.8 | 4080.6 | 4081.2 | 122.60 | 68.01 | 68.02 |
| 11 5 | 7355.6 | 4081.0 | 4081.4 | 122.59 | 68.02 | 68.02 |
| 11 20 | 7355.6 | 4081.0 | 4081.4 | 122.59 | 68.02 | 68.02 |
| 11 35 | 7355.4 | 4081.4 | 4081.4 | 122.59 | 68.02 | 68.02 |
| 11 50 | 7355.2 | 4081.6 | 4081.6 | 122.59 | 68.03 | 68.03 |
| 12 5 | 7355.0 | 4081.8 | 4081.6 | 122.58 | 68.03 | 68.03 |
| 12 20 | 7354.8 | 4082.0 | 4081.6 | 122.58 | 68.03 | 68.03 |
| 12 35 | 7354.6 | 4082.0 | 4081.6 | 122.58 | 68.03 | 68.03 |
| 12 50 | 7354.2 | 4082.2 | 4081.6 | 122.57 | 68.04 | 68.03 |
| 13 5 | 7354.0 | 4082.4 | 4081.6 | 122.57 | 68.04 | 68.03 |
| 13 20 | +7353.6 | —4082.4 | —4081.6 | +122.56 | —68.04 | —68.03 |



ECLIPSE
OF
SEPT. 28, 1856.

IV. A Partial Eclipse of the Moon, Oct. 13, 1856, with the following elements: —

| | d. | h. | m. | s. |
|---|---|---|---|---|
| Washington Mean Time of ☍ in Right Ascension, Oct. | 13 | 6 | 12 | 16.6. |

| | | | |
|---|---|---|---|
| | h. m. s. | | s. |
| Sun's Right Ascension | 13 16 52.66 | Hourly Motion | 9.28 |
| Moon's Right Ascension | 1 16 52.66 | " " | 137.45 |
| | ° ′ ″ | | ′ ″ |
| Sun's Declination | — 8 7 49.2 | Hourly Motion | — 0 55.9 |
| Moon's Declination | + 8 41 13.4 | " " | +17 34.4 |
| Moon's Longitude | 21 1 2.2 | " " | 38 5.2 |
| Moon's Latitude | + 0 30 56.3 | " " | + 3 30.7 |
| Sun's Equa. Hor. Par. | 8.6 | True Semidiameter | 16 5.0 |
| Moon's Equa. Hor. Par. | 61 26.2 | " " | 16 44.3 |

From these elements may be deduced the following results: —

| | h. m. | |
|---|---|---|
| Moon enters Penumbra | 3 15.8 | Washington Mean Time. |
| Moon enters Shadow | 4 12.9 | " " |
| Greatest Eclipse | 5 46.2 | " " |
| Moon leaves Shadow | 7 19.5 | " " |
| Moon leaves Penumbra | 8 16.6 | " " |

First contact of Shadow with Moon's limb 91° from north point towards the East.

Last contact of Shadow with Moon's limb 145° from north point towards the West.

Magnitude of Eclipse = 0.998 (Moon's diameter = 1).

Eclipse visible throughout Europe, Africa, and the greater part of Asia, on the western coast of Australia, throughout South and Central America, in the eastern part of Mexico, most of the United States, and the Canadas.

Whole Eclipse visible throughout Europe and Africa, in the western part of Asia, and on the eastern coast of South America.

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Jan. 0 | *h* Virginis | 6 | +81 | +40 | 21 52.1 | + 3 8 36 | +1.3446 | 0.4925 | —.2490 | —9.2140 | 9.9941 |
| 1 | *m* Virginis | 6 | —23 | —90 | 2 35.4 | + 7 43 57 | —1.1574 | .4976 | —.2471 | —9.1422 | .9958 |
| 1 | B.A.C. 4591 | 6½ | 0 | —90 | 5 35.3 | +10 38 49 | —0.7955 | .4989 | —.2456 | —9.1935 | .9946 |
| 1 | λ Virginis | 4½ | —15 | —90 | 22 17.9 | + 2 52 24 | —1.0016 | .5111 | —.2330 | —9.3422 | .9892 |
| 2 | B.A.C. 4896 | 6 | +58 | —23 | 14 29.1 | — 5 25 53 | +0.3955 | .5216 | —.2160 | —9.4706 | .9802 |
| 3 | $\iota^1$ Libræ | 4½ | +51 | —28 | 0 21.1 | + 4 7 14 | +0.3045 | .5309 | —.2028 | —9.5179 | .9750 |
| 3 | $\iota^2$ Libræ | 6½ | +37 | —41 | 0 52.4 | + 4 37 30 | +0.0447 | .5331 | —.2014 | —9.5148 | .9754 |
| 3 | δ Scorpii | 2½ | 0 | —83 | 22 6.4 | + 1 8 16 | —0.5776 | .5568 | —.1644 | —9.5774 | .9666 |
| 4 | B.A.C. 5335 | 6½ | +42 | —31 | 0 35.4 | + 3 32 2 | +0.2378 | .5554 | —.1602 | —9.5957 | .9633 |
| 4 | B.A.C. 5354 | 6½ | +37 | —35 | 1 43.3 | + 4 37 28 | +0.1510 | .5565 | —.1580 | —9.5973 | .9631 |
| 4 | 19 Scorpii | 5½ | +23 | —49 | 6 47.4 | + 9 30 33 | —0.0937 | .5624 | —.1472 | —9.6062 | .9613 |
| 4 | σ Scorpii | 3½ | +65 | +37 | 6 58.6 | + 9 41 23 | +1.2221 | .5582 | —.1450 | —9.6299 | .9564 |
| 4 | ϱ Ophiuchi | 5 | —54 | —90 | 8 53.7 | +11 32 13 | —1.2809 | .5709 | —.1405 | —9.5939 | .9636 |
| 4 | 22 Scorpii | 5 | +46 | —24 | 10 47.3 | —10 38 23 | +0.3516 | .5646 | —.1380 | —9.6226 | .9580 |
| 4 | 25 Scorpii | 6 | +22 | —47 | 17 38.9 | — 4 2 14 | —0.0606 | .5732 | —.1209 | —9.6303 | .9563 |
| 4 | 18 Ophiuchi | 6 | —39 | —90 | 18 50.7 | — 2 53 9 | —1.1200 | .5786 | —.1183 | —9.6158 | .9594 |
| 4 | B.A.C. 5709 | 6 | —48 | —90 | 22 57.8 | + 1 4 28 | —1.2023 | .5843 | —.1052 | —9.6239 | .9577 |
| 5 | A Ophiuchi | 5 | +11 | —57 | 5 5.2 | + 6 57 30 | —0.2196 | .5848 | —.0884 | —9.6477 | .9522 |
| 5 | 43 Ophiuchi | 6 | +62 | +38 | 8 9.5 | + 9 54 34 | +1.2020 | .5799 | —.0800 | —9.6716 | .9459 |
| 5 | B A.C. 5909 | 6½ | —27 | —90 | 11 27.6 | —10 55 15 | —0.8857 | .5929 | —.0712 | —9.6444 | .9530 |
| 5 | 3 Sagittarii | 5 | +39 | —23 | 17 32.7 | — 5 4 57 | +0.3727 | .5905 | —.0530 | —9.6684 | .9469 |
| 9 | ε Capricor. | 4½ | +44 | —32 | 9 22.3 | + 7 8 34 | +0.2123 | .5736 | +.2088 | —9.5364 | .9727 |
| 9 | κ Capricor. | 5 | +39 | —38 | 11 39.8 | + 9 20 52 | +0.1096 | .5727 | +.2129 | —9.5240 | .9743 |
| 9 | 29 Aquarii | 6 | +40 | —39 | 19 57.4 | + 9 15 58 | +0.0845 | .5645 | +.2295 | —9.4819 | .9791 |
| 10 | 50 Aquarii | 6 | —43 | —90 | 5 23.0 | + 2 24 49 | —1.3119 | .5607 | +.2439 | —9.3915 | .9864 |
| 10 | B.A.C. 7835 | 6½ | —45 | —90 | 7 48.0 | + 4 44 37 | —1.3262 | .5598 | +.2468 | —9.3730 | .9876 |
| 10 | 56 Aquarii | 6 | +72 | —12 | 7 54.1 | + 4 51 32 | +0.6095 | .5539 | +.2475 | —9 4221 | .9843 |
| 10 | 70 Aquarii | 6 | —46 | —90 | 15 55.9 | —11 24 44 | —1.3539 | .5529 | +.2582 | —9.2928 | .9915 |
| 10 | 74 Aquarii | 6 | +55 | —29 | 18 8.1 | — 9 17 7 | +0.2797 | .5480 | +.2602 | —9.3313 | .9898 |
| 11 | $\psi^1$ Aquarii | 4½ | +67 | —21 | 4 13.4 | + 0 27 20 | +0.4484 | .5415 | +.2695 | —9.2342 | .9935 |
| 11 | χ Aquarii | 5½ | —16 | —90 | 4 41.7 | + 0 54 41 | —1.0541 | .5437 | +.2696 | —9.1703 | .9952 |
| 11 | $\psi^2$ Aquarii | 4½ | +70 | — 2 | 5 10.1 | + 1 22 6 | +0.7994 | .5403 | +.2701 | —9.2384 | .9934 |
| 11 | $\psi^3$ Aquarii | 5 | +80 | +42 | 5 36.6 | + 1 47 43 | +1.3571 | .5396 | +.2702 | —9.2565 | .9928 |
| 11 | 24 Piscium | 6½ | + 4 | —90 | 21 23.3 | — 6 57 10 | —0.7625 | .5346 | +.2780 | —8.8387 | .9990 |
| 12 | 27 Piscium | 5 | +66 | —24 | 0 5.0 | — 4 20 41 | +0.3956 | .5322 | +.2796 | —8.8806 | .9987 |
| 12 | 29 Piscium | 5½ | +59 | —29 | 1 34.4 | — 2 54 12 | +0.2805 | .5325 | +.2798 | —8 8248 | 9.9990 |
| 12 | 10 Ceti | 6 | +79 | —14 | 13 19.5 | + 8 28 3 | +0.5764 | .5289 | +.2804 | —8.1704 | 0.0000 |
| 13 | 73 Piscium | 6½ | +37 | —50 | 7 36.3 | + 2 9 40 | —0.1293 | .5267 | +.2752 | +8.9300 | 9.9984 |
| 13 | 77 Piscium *pr.* | 7 | +90 | — 4 | 8 3.9 | + 2 36 21 | +0.7501 | .5276 | +.2747 | +8.8584 | .9989 |
| 13 | *e* Piscium | 5½ | +63 | —26 | 9 18.1 | + 3 48 13 | +0.3320 | .5272 | +.2742 | +8.9304 | .9984 |
| 13 | ζ Piscium | 6 | — 6 | —83 | 11 49.5 | + 6 14 42 | —0.9361 | .5258 | +.2731 | +9.0742 | .9969 |
| 13 | 88 Piscium | 6½ | +33 | —55 | 12 18.5 | + 6 42 51 | —0.2151 | .5270 | +.2725 | +9.0357 | .9974 |
| 14 | 54 Ceti | 6 | +54 | —32 | 5 30.9 | — 0 37 56 | +0.1863 | .5298 | +.2588 | +9.2536 | .9929 |
| 15 | 29 Arietis | 6½ | +90 | + 8 | 1 10.2 | — 5 37 15 | +0.8766 | .5379 | +.2348 | +9.3956 | .9862 |
| 15 | 40 Arietis | 6 | — 4 | —72 | 8 16.6 | + 1 14 53 | —0.8794 | .5360 | +.2243 | +9.4825 | .9790 |
| 15 | π Arietis | 5½ | +47 | —34 | 8 40.5 | + 1 38 5 | +0.0511 | 5386 | +.2244 | +9.4626 | .9809 |
| 15 | $\varrho^2$ Arietis | 6 | +33 | —47 | 11 38.3 | + 4 29 51 | —0.2070 | .5390 | +.2196 | +9.4840 | .9788 |
| 15 | $\varrho^3$ Arietis | 6 | +52 | —28 | 11 54.5 | + 4 45 30 | +0.1464 | .5409 | +.2179 | +9.4772 | .9795 |
| 15 | 54 Arietis | 6½ | +75 | —10 | 17 19.0 | + 9 59 1 | +0.4987 | .5440 | +.2094 | +9.4956 | .9776 |
| 15 | δ Arietis | 4½ | +35 | —44 | 18 46.0 | +11 22 12 | —0.1752 | .5423 | +.2077 | +9.5166 | .9752 |
| 15 | ζ Arietis | 4½ | —36 | —70 | 20 13 7 | —11 12 10 | —1.2563 | .5398 | +.2041 | +9.5445 | .9715 |
| 15 | B.A.C. 1032 | 6½ | +34 | —43 | 22 54.5 | — 8 36 55 | —0.1725 | .5449 | +.1990 | +9.5338 | .9730 |
| 15 | $\tau^1$ Arietis | 5 | 0 | —69 | 23 3.4 | — 8 27 18 | —0.8081 | .5428 | +.1990 | +9.5469 | .9712 |
| 15 | $\tau^2$ Arietis | 6 | +30 | —47 | 23 45.3 | — 7 47 49 | —0.2524 | .5441 | +.1985 | +9.5387 | .9723 |
| 16 | 65 Arietis | 6 | +34 | —42 | 0 49.6 | — 6 45 0 | —0.1755 | 0.5444 | +.1967 | +9.5401 | 9.9722 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Jan. 16 | 19 Pleiadum | 8 | —48 | —67 | 10 34.1 | + 2 38 25 | —1.3286 | 0.5455 | +.1768 | +9.5952 | 9.9634 |
| 16 | 25 Pleiadum | 8½ | —39 | —67 | 10 41.3 | + 2 45 18 | —1.2785 | .5457 | +.1760 | +9.5947 | .9635 |
| 16 | 26 Pleiadum | 9 | —29 | —67 | 10 43.9 | + 2 47 54 | —1.2001 | .5459 | +.1758 | +9.5936 | .9637 |
| 16 | 28 Pleiadum | 7 | —14 | —67 | 11 0.5 | + 3 3 53 | —1.0062 | .5473 | +.1746 | +9.5912 | .9641 |
| 16 | 34 Pleiadum | 7½ | —35 | —67 | 11 36.8 | + 3 38 53 | —1.2269 | .5463 | +.1745 | +9.5967 | .9632 |
| 16 | B.A.C. 1189 | 7 | +64 | —14 | 11 44.0 | + 3 45 56 | +0.3280 | .5521 | + 1743 | +9.5699 | .9678 |
| 16 | 32 Tauri | 6 | +83 | — 1 | 14 42.7 | + 6 38 11 | +0.5759 | .5543 | +.1682 | +9.5747 | .9670 |
| 16 | 33 Tauri | 6 | +36 | —37 | 14 50.1 | + 6 45 24 | —0.1384 | .5516 | +.1682 | +9.5875 | .9648 |
| 16 | 36 Tauri | 6½ | +10 | —63 | 17 59.0 | + 9 47 32 | —0.6215 | .5521 | +.1593 | +9.6044 | .9617 |
| 17 | χ Tauri | 5½ | —24 | —65 | 1 58.0 | — 6 40 19 | —1.1023 | .5527 | +.1432 | +9.6306 | .9563 |
| 17 | *k* Tauri | 6 | +90 | +55 | 16 55.2 | + 7 53 54 | +1.2573 | .5692 | +.1034 | +9 6231 | .9579 |
| 18 | 136 Tauri | 5 | +47 | —16 | 15 54.2 | + 6 1 41 | +0.0419 | .5680 | +.0412 | +9.6655 | .9477 |
| 19 | 49 Aurigæ | 5½ | +20 | —38 | 9 21.0 | — 1 10 27 | —0.4150 | .5653 | —.0061 | +9.6735 | .9454 |
| 19 | 54 Aurigæ | 6 | +14 | —46 | 11 10.1 | + 0 34 34 | —0.5273 | .5635 | —.0117 | +9.6771 | .9444 |
| 20 | 47 Geminor. | 6 | +75 | + 6 | 0 39.9 | —10 25 22 | +0.4688 | .5648 | —.0470 | +9.6584 | .9496 |
| 20 | 53 Geminor. | 6 | — 1 | —62 | 2 35.0 | — 8 34 27 | —0.7654 | .5578 | —.0525 | +9.6736 | .9453 |
| 20 | ι Geminor. | 4 | —13 | —62 | 6 47.5 | — 4 31 8 | —0.9432 | .5555 | —.0616 | +9.6728 | .9456 |
| 20 | *b*² Geminor. | 5½ | —38 | —62 | 8 32.6 | — 2 49 49 | —1.1992 | .5534 | —.0679 | +9.6746 | .9451 |
| 20 | B.A.C. 2472 | 6 | —42 | —62 | 8 54.5 | — 2 28 39 | —1.2263 | .5525 | —.0704 | +9.6746 | .9451 |
| 20 | υ Geminor. | 5 | +26 | —38 | 11 13.0 | — 0 15 9 | —0.3123 | .5559 | —.0756 | +9.6602 | .9490 |
| 20 | *c* Geminor. | 6 | +85 | + 8 | 14 48.9 | + 3 13 4 | +0.5801 | .5588 | —.0832 | +9.6438 | .9532 |
| 20 | φ Geminor. | 5 | —10 | —64 | 18 54.4 | + 7 9 54 | —0.9202 | .5491 | —.0954 | +9.6590 | .9494 |
| 20 | ω¹ Cancri | 6 | +60 | —11 | 22 13.8 | +10 22 20 | +0.2583 | .5524 | —.1026 | +9.6385 | .9545 |
| 20 | ω² Cancri | 6½ | +82 | + 4 | 22 35.8 | +10 43 31 | +0.5492 | .5538 | —.1026 | +9.6637 | .9555 |
| 21 | ψ¹ Cancri | 6½ | + 4 | —64 | 2 12 0 | — 9 48 5 | —0.7076 | .5461 | —.1118 | +9.6460 | .9527 |
| 21 | ψ² Cancri | 4 | +23 | —44 | 2 29.0 | — 9 31 22 | —0.3687 | .5473 | —.1118 | +9.6410 | .9538 |
| 21 | λ Cancri | 6 | +90 | +10 | 6 53.9 | — 5 15 53 | +0.6940 | .5482 | —.1230 | +9.6173 | .9591 |
| 21 | υ³ Cancri | 6 | +41 | —29 | 12 4.5 | — 0 15 28 | —0.0444 | .5419 | —.1339 | +9.6188 | .9588 |
| 22 | ξ Cancri | 5 | +10 | —64 | 5 54.3 | — 7 0 54 | —0.6212 | 5268 | —.1688 | +9.5852 | .9652 |
| 22 | 79 Cancri | 6 | + 8 | —65 | 6 22.8 | — 6 33 19 | —0.6504 | .5272 | —.1688 | +9.5843 | .9654 |
| 22 | B.A.C. 3188 | 6 | +36 | —39 | 7 57.7 | — 5 1 25 | —0.1507 | .5274 | —.1723 | +9.5712 | .9676 |
| 23 | η Leonis | 3½ | +17 | —64 | 11 0.6 | — 2 48 11 | —0.5037 | .5077 | —.2116 | +9.4772 | .9795 |
| 23 | 42 Leonis | 6 | +32 | —49 | 18 41.4 | + 4 39 15 | —0.2154 | .5046 | —.2196 | +9.4323 | .9835 |
| 23 | B.A.C. 3579 | 6 | +26 | —57 | 22 21.9 | + 8 13 25 | —0.3417 | .5041 | —.2239 | +9.4151 | .9848 |
| 24 | *i* Leonis | 6 | +17 | —68 | 0 10.5 | + 9 58 52 | —0.5236 | .5012 | —.2258 | +9.4094 | .9852 |
| 24 | *l* Leonis | 5 | +90 | +38 | 9 26.2 | — 5 1 2 | +1.2942 | .5008 | —.2339 | +9.2923 | .9915 |
| 25 | B.A.C. 3996 | 6 | —12 | —84 | 19 1.3 | + 3 39 26 | —1.0342 | .4833 | —.2528 | +9.0187 | .9976 |
| 26 | *b* Virginis | 6 | + 3 | —75 | 1 47.3 | +10 15 47 | —0.7927 | .4825 | —.2545 | +8.8903 | .9987 |
| 26 | 10 Virginis | 6 | +24 | —66 | 6 48.0 | — 8 52 27 | —0.3831 | .4822 | —.2555 | +8.6738 | 9.9995 |
| 26 | 18 Virginis | 6 | +90 | +31 | 11 57.8 | — 3 50 50 | +1.2823 | .4821 | —.2561 | +6.2985 | 0.0000 |
| 26 | η Virginis | 3½ | +90 | + 7 | 12 40.5 | — 3 9 12 | +0.9654 | .4821 | —.2562 | +7.3632 | 0.0000 |
| 27 | γ Virginis | 2½ | —41 | —90 | 1 12.7 | + 9 3 11 | —1.3677 | .4828 | —.2560 | —8.0609 | 0.0000 |
| 27 | 38 Virginis | 6 | + 7 | —90 | 7 45.3 | — 8 34 36 | —0.7058 | .4835 | —.2551 | —8.6843 | 9.9995 |
| 27 | *k* Virginis | 6 | —39 | —90 | 11 25.0 | — 5 0 39 | —1.3465 | .4849 | —.2543 | —8.7238 | .9994 |
| 27 | θ Virginis | 4½ | — 4 | —90 | 17 14.1 | + 0 39 9 | —0.9032 | .4864 | —.2527 | —8.9200 | .9985 |
| 28 | *h* Virginis | 6 | +81 | +10 | 6 4.0 | —10 51 49 | +1.0090 | .4890 | —.2474 | —9.2141 | .9941 |
| 28 | B.A.C. 4591 | 6½ | —51 | —90 | 13 53.7 | — 3 15 0 | —1.3912 | .4961 | —.2429 | —9.1936 | .9946 |
| 29 | λ Virginis | 4½ | —46 | —90 | 6 58.6 | —10 44 0 | —1.3421 | .5069 | —.2297 | —9.3424 | .9892 |
| 29 | B.A.C. 4896 | 6 | +30 | —52 | 23 24.8 | + 5 17 40 | —0.1361 | .4994 | —.2126 | —9.4707 | .9802 |
| 30 | ι¹ Libræ | 4½ | +35 | —44 | 9 28.1 | — 8 57 50 | +0.0080 | .5244 | —.1992 | —9.5180 | .9750 |
| 30 | ι² Libræ | 6½ | +21 | —59 | 10 0.5 | — 8 26 28 | —0.2540 | .5266 | —.1978 | —9.5148 | .9754 |
| 31 | B.A.C. 5254 | 6 | +67 | +18 | 4 48.4 | + 9 44 17 | +1.0505 | .5383 | —.1677 | —9.6015 | .9622 |
| 31 | δ Scorpii | 2½ | —15 | —90 | 7 42.5 | —11 27 36 | —0.8453 | .5484 | —.1610 | —9.5775 | .9665 |
| 31 | B.A.C. 5335 | 6½ | +20 | —54 | 10 15.0 | — 9 0 24 | —0.1792 | .5492 | —.1564 | —9.5957 | .9633 |
| 31 | B.A C. 5354 | 6½ | +16 | —60 | 11 24.1 | — 7 53 41 | —0.2618 | 0.5507 | —.1544 | —9 5973 | 9.9631 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Jan. 31 | 19 Scorpii | 5½ | + 3 | —76 | 16 34.8 | — 2 53 58 | —0.4896 | 0.5581 | —.1436 | —9.6062 | 9.9613 |
| 31 | σ Scorpii | 3½ | +65 | +14 | 16 46.3 | — 2 42 53 | +0.9906 | .5499 | —.1431 | —9.6296 | .9564 |
| 31 | 22 Scorpii | 5 | +25 | —45 | 20 39.8 | + 0 58 16 | —0.0212 | .5582 | —.1342 | —9.6226 | .9580 |
| Feb. 1 | 25 Scorpii | 6 | + 4 | —70 | 3 39.9 | + 7 42 58 | —0.4049 | .5667 | —.1175 | —9.6303 | .9563 |
| 1 | B.A.C. 5800 | 6½ | +24 | —41 | 14 49.9 | + 0 27 30 | +0.0461 | .5745 | —.0889 | —9.6542 | .9506 |
| 1 | A Ophiuchi | 5 | 0 | —71 | 15 19.3 | — 5 4 11 | —0.4172 | .5784 | —.0862 | —9.6478 | .9522 |
| 1 | 38 Ophiuchi | 6½ | 0 | —70 | 16 13.6 | — 4 12 1 | —0.4100 | .5790 | —.0834 | —9.6490 | .9519 |
| 1 | 43 Ophiuchi | 6 | +62 | +17 | 18 26.9 | — 2 3 52 | +1.0000 | .5737 | —.0778 | —9.6716 | .9459 |
| 1 | B.A.C. 5909 | 6½ | —46 | —90 | 21 46.3 | + 1 11 32 | —1.1450 | .5862 | —.0692 | —9.6444 | .9530 |
| 2 | 3 Sagittarii | 5 | +26 | —35 | 3 59.0 | + 7 9 30 | +0.1546 | .5860 | —.0486 | —9.6684 | .9469 |
| 2 | B.A.C. 6024 | 6½ | —17 | —90 | 5 5.3 | + 8 13 9 | —0.6816 | .5905 | —.0455 | —9.6572 | .9498 |
| 2 | B.A.C. 6063 | 6½ | +32 | —28 | 7 31.0 | +10 32 59 | +0.2732 | .5871 | —.0394 | —9.6722 | .9458 |
| 2 | B.A.C. 6072 | 6½ | +61 | +14 | 8 14.9 | +11 15 4 | +0.9598 | .5839 | —.0363 | —9.6819 | .9429 |
| 2 | B.A.C. 6120 | 6½ | +51 | —10 | 11 23.0 | — 9 44 28 | +0.5864 | .5876 | —.0270 | —9.6783 | .9440 |
| 2 | B.A.C. 6127 | 5 | +50 | —11 | 11 51.8 | — 9 16 50 | +0.5715 | .5885 | —.0239 | —9.6782 | .9440 |
| 2 | B.A.C. 6190 | 6½ | +61 | — 1 | 15 25.7 | — 5 51 42 | +0.7323 | .5891 | —.0144 | —9.6814 | .9431 |
| 2 | B.A.C. 6191 | 6½ | +35 | —24 | 15 25.9 | — 5 51 28 | +0.3573 | .5912 | —.0144 | —9.6763 | .9446 |
| 2 | B.A.C. 6194 | 5½ | —33 | —90 | 15 43.5 | — 5 34 36 | —0.9107 | .5973 | —.0143 | —9.6584 | .9495 |
| 2 | B.A.C. 6220 | 6½ | +44 | —15 | 17 11.1 | — 4 50 34 | +0.5064 | .5914 | —.0080 | —9.6786 | .9439 |
| 3 | φ Sagittarii | 3½ | —28 | —90 | 2 9.0 | + 4 24 58 | —0.8356 | .6024 | +.0213 | —9.6591 | .9495 |
| 3 | τ Sagittarii | 3½ | +29 | —33 | 10 6.6 | —11 57 22 | +0.1983 | .5984 | +.0476 | —9.6698 | .9464 |
| 3 | B.A.C. 6628 | 6 | +62 | + 5 | 16 39.8 | — 5 40 40 | +0.8381 | .5954 | +.0676 | —9.6736 | .9454 |
| 3 | B.A.C. 6666 | 6 | +32 | —38 | 18 41.2 | — 3 44 24 | +0.1124 | .5994 | +.0738 | —9.6611 | .9488 |
| 4 | ω Sagittarii | 5½ | +45 | —22 | 4 24.8 | + 5 34 47 | +0.3950 | .5968 | +.1060 | —9.6523 | .9511 |
| 4 | A Sagittarii | 5 | +48 | —22 | 5 35.8 | + 6 42 50 | +0.4175 | .5965 | +.1425 | —9.6508 | .9515 |
| 7 | 74 Aquarii | 6 | +62 | —23 | 3 25.7 | + 1 48 49 | +0.4000 | .5571 | +.2666 | —9.3313 | .9898 |
| 7 | $\psi^1$ Aquarii | 4½ | +78 | —11 | 13 20.7 | +11 22 36 | +0.6302 | .5508 | +.2765 | —9.2342 | .9935 |
| 7 | χ Aquarii | 5½ | + 1 | —90 | 13 47.9 | +11 48 53 | —0.8250 | .5530 | +.2765 | —9.1703 | .9952 |
| 7 | $\psi^2$ Aquarii | 4½ | +80 | + 8 | 14 15.5 | —11 44 28 | +0.9779 | .5498 | +.2772 | —9.2384 | .9934 |
| 8 | 24 Piscium | 6½ | +17 | —75 | 5 56.1 | + 3 24 32 | —0.5214 | .5441 | +.2861 | —8.8387 | .9990 |
| 8 | 27 Piscium | 5 | +82 | —12 | 8 31.8 | + 5 53 58 | +0.6229 | .5426 | +.2866 | —8.8806 | .9987 |
| 8 | 29 Piscium | 5½ | +74 | —18 | 9 58.5 | + 7 17 44 | +0.5125 | .5420 | +.2870 | —8.8247 | .9990 |
| 9 | 44 Piscium | 6 | +89 | +10 | 20 45.6 | — 6 16 59 | +1.0148 | .5390 | +.2874 | —8.3000 | 9.9999 |
| 9 | 10 Ceti | 6 | —18 | —89 | 21 19.2 | — 5 44 29 | —1.1207 | .5388 | +.2874 | +8.1705 | 0.0000 |
| 9 | B.A.C. 274 | 6½ | —35 | —84 | 12 38.4 | + 9 14 1 | —1.3216 | .5349 | +.2824 | +8.9973 | 9.9978 |
| 9 | 73 Piscium | 6½ | +52 | —35 | 14 58.9 | +11 18 56 | +0.1560 | .5360 | +.2806 | +8.9300 | .9984 |
| 9 | 77 Piscium *pr.* | 7 | +90 | +12 | 15 25.4 | +11 49 32 | +1.0219 | .5368 | +.2806 | +8.8583 | .9989 |
| 9 | *e* Piscium | 5½ | +83 | —12 | 16 37.2 | —11 5 1 | +0.6105 | .5363 | +.2803 | +8.9304 | .9984 |
| 9 | ζ Piscium | 6 | +12 | —81 | 19 3.6 | — 8 43 32 | —0.6331 | .5351 | +.2780 | +9.0742 | .9969 |
| 9 | 88 Piscium | 6½ | +48 | —39 | 19 31.7 | — 8 16 20 | +0.0770 | .5359 | +.2780 | +9.0357 | .9974 |
| 10 | 54 Ceti | 6 | +73 | —16 | 12 12.8 | + 7 51 30 | +0.4848 | .5376 | +.2625 | +9.2535 | .9929 |
| 11 | 29 Arietis | 6½ | +90 | +28 | 7 21.9 | + 2 21 54 | +1.1695 | .5439 | +.2374 | +9.3956 | .9861 |
| 11 | 40 Arietis | 6 | +14 | —68 | 14 21.4 | + 9 7 10 | —0.5712 | .5415 | +.2261 | +9.4825 | .9790 |
| 11 | π Arietis | 5½ | +65 | —19 | 14 43.0 | + 9 27 58 | +0.3501 | .5440 | +.2261 | +9.4626 | .9809 |
| 11 | $\varrho^2$ Arietis | 6 | +49 | —31 | 17 37.1 | —11 43 56 | +0.0922 | .5427 | +.2261 | +9.4841 | .9788 |
| 11 | $\varrho^3$ Arietis | 6 | +71 | —13 | 17 53.0 | —11 28 32 | +0.4426 | .5444 | +.2192 | +9.4772 | .9795 |
| 11 | 54 Arietis | 6½ | +90 | + 6 | 23 12.0 | — 6 20 32 | +0.7893 | .5487 | +.2101 | +9.4956 | .9776 |
| 12 | δ Arietis | 4½ | +50 | —29 | 0 37.6 | — 4 57 53 | +0.1209 | .5480 | +.2084 | +9.5167 | .9762 |
| 12 | ζ Arietis | 4½ | — 9 | —69 | 2 3.9 | — 3 34 35 | —0.9539 | .5441 | +.2045 | +9.5445 | .9715 |
| 12 | B.A.C. 1032 | 6½ | +51 | —24 | 4 42.1 | — 1 1 56 | +0.1199 | .5481 | +.2006 | +9.5338 | .9730 |
| 12 | $\tau^1$ Arietis | 5 | +17 | —61 | 4 50.9 | — 0 53 25 | —0.5109 | .5459 | +.2006 | +9.5468 | .9712 |
| 12 | $\tau^2$ Arietis | 6 | +46 | —31 | 5 32.2 | — 0 13 33 | +0.0397 | .5483 | +.1987 | +9.5387 | .9723 |
| 12 | 65 Arietis | 6 | +51 | —27 | 6 16.2 | + 0 28 53 | +0.1157 | .5490 | +.1966 | +9.5401 | .9722 |
| 12 | B.A.C. 1155 | 7. | +10 | —66 | 15 34.4 | + 9 27 26 | —0.6409 | .5494 | +.1952 | +9.5864 | .9650 |
| 12 | 14 Pleiadum | 9 | —29 | —65 | 16 8.1 | + 9 59 51 | —1.1817 | 0.5478 | +.1806 | +9.5975 | 9.9630 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | H | Y | p' | q' | Log sin D | Log cos D |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Feb. 12 | 16 Pleiadum | 9½ | —34 | —65 | 16 11.2 | +10 2 50 | —1.2263 | 0.5475 | +.1794 | +9.5985 | 9.9628 |
| 12 | 17 Pleiadum | 8 | —24 | —65 | 16 11.7 | +10 3 24 | —1.1298 | .5480 | +.1791 | +9.5968 | .9631 |
| 12 | 19 Pleiadum | 8 | —16 | —66 | 16 13.0 | +10 4 38 | —1.0337 | .5484 | +.1788 | +9.5952 | .9634 |
| 12 | 22 Pleiadum | 8 | —50 | —65 | 16 14.3 | +10 5 54 | —1.3216 | .5474 | +.1788 | +9.6002 | .9625 |
| 12 | 23 Pleiadum | 8½ | —19 | —65 | 16 15.7 | +10 7 16 | —1.0695 | .5484 | +.1780 | +9.5960 | .9633 |
| 12 | 25 Pleiadum | 8½ | —13 | —65 | 16 20.7 | +10 12 4 | —0.9863 | .5488 | +.1768 | +9.5948 | .9635 |
| 12 | 26 Pleiadum | 9 | — 8 | —65 | 16 22.7 | +10 13 58 | —0.9101 | .5492 | +.1755 | +9.5937 | .9637 |
| 12 | 28 Pleiadum | 7 | + 4 | —67 | 16 39.1 | +10 29 49 | —0.7199 | .5499 | +.1748 | +9.5912 | .9641 |
| 12 | s Pleiadum | 7½ | —26 | —65 | 16 54.5 | +10 44 36 | —1.1484 | .5484 | +.1745 | +9.5992 | .9627 |
| 12 | 30 Pleiadum | 8½ | —27 | —65 | 17 1.2 | +10 51 5 | —1.1604 | .5483 | +.1743 | +9.5997 | .9626 |
| 12 | 34 Pleiadum | 7½ | —10 | —65 | 17 15.0 | + 7 4 24 | —0.9401 | .5492 | +.1739 | +9.5967 | .9632 |
| 12 | 38 Pleiadum | 8 | —19 | —65 | 17 21.1 | +11 10 18 | —1.0656 | .5485 | +.1736 | +9.5991 | .9627 |
| 12 | B.A.C. 1189 | 7 | +85 | 0 | 17 22.1 | +11 11 15 | +0.6059 | .5550 | +.1734 | +9.5699 | .9678 |
| 12 | 40 Pleiadum | 7½ | —24 | —67 | 17 44.5 | +11 33 53 | —1.1212 | .5482 | +.1727 | +9.6012 | .9623 |
| 12 | 32 Tauri | 6 | +90 | +15 | 20 21.8 | — 9 55 29 | +0.8486 | .5569 | +.1667 | +9.5747 | .9670 |
| 12 | 33 Tauri | 6 | +50 | —24 | 20 26.2 | — 9 51 9 | —0.1520 | .5542 | +.1667 | +9.5875 | .9648 |
| 12 | 36 Tauri | 6½ | +25 | —47 | 23 33.9 | — 6 50 11 | —0.3447 | .5534 | +.1563 | +9.6044 | .9617 |
| 13 | χ Tauri | 5½ | — 3 | —65 | 7 19.8 | + 0 38 55 | —0.8322 | .5540 | +.1409 | +9.6306 | .9563 |
| 14 | B.A.C. 1648 | 6½ | — 2 | —62 | 7 55.3 | + 0 20 20 | —0.7989 | .5592 | +.0763 | +9.6689 | .9467 |
| 14 | B.A.C. 1746 | 6½ | +38 | —25 | 14 11.3 | + 6 22 22 | —0.1109 | .5634 | +.0600 | +9.6654 | .9477 |
| 14 | 136 Tauri | 5 | +59 | — 5 | 21 28.0 | —10 37 7 | +0.2478 | .5653 | +.0408 | +9.6655 | .9476 |
| 14 | B.A.C. 1882 | 6½ | —29 | —61 | 22 46.9 | — 9 21 8 | —1.1311 | .5585 | +.0383 | +9.6844 | .9422 |
| 15 | B.A.C. 2097 | 6½ | +30 | —27 | 13 0.2 | + 4 20 38 | —0.2368 | .5649 | —.0034 | +9.6760 | .9447 |
| 15 | 49 Aurigæ | 5½ | +41 | —18 | 15 3.1 | + 6 19 2 | —0.0590 | .5415 | —.0085 | +9.6735 | .9454 |
| 15 | 53 Aurigæ | 6½ | —29 | —61 | 16 22.2 | + 7 35 13 | —1.1220 | .5563 | —.0116 | +9.6870 | .9414 |
| 15 | 54 Aurigæ | 6 | +24 | —35 | 16 53.2 | + 8 5 4 | —0.3564 | .5596 | —.0143 | +9.6771 | .9444 |
| 15 | 28 Geminor. | 6 | —35 | —61 | 19 4.4 | +10 11 29 | —1.1744 | .5551 | —.0197 | +9.6872 | .9413 |
| 16 | 47 Geminor. | 6 | +89 | —13 | 6 31.2 | — 2 46 37 | +0.6162 | .5603 | —.0489 | +9.6584 | .9495 |
| 16 | 53 Geminor. | 6½ | + 8 | —56 | 8 27.7 | — 0 54 23 | —0.6259 | .5537 | —.0543 | +9.6736 | .9453 |
| 16 | 59 Geminor. | 6½ | +10 | —54 | 12 11.9 | + 2 41 49 | —0.5970 | .5522 | —.0645 | +9.6704 | .9463 |
| 16 | ι Geminor. | 4 | — 4 | —62 | 12 42.8 | + 3 11 40 | —0.8130 | .5514 | —.0646 | +9.6728 | .9456 |
| 16 | $b^2$ Geminor. | 5½ | —23 | —62 | 14 29.1 | + 4 54 9 | —1.0735 | .5492 | —.0697 | +9.6746 | .9451 |
| 16 | B.A.C. 2472 | 6 | —26 | —62 | 14 51.1 | + 5 15 21 | —1.1008 | .5493 | —.0697 | +9.6746 | .9451 |
| 16 | υ Geminor. | 5 | +33 | —31 | 17 11.3 | + 7 30 39 | —0.1890 | .5517 | —.0772 | +9.6602 | .9490 |
| 16 | c Geminor. | 6 | +90 | +14 | 20 49.7 | +11 1 17 | +0.6992 | .5545 | —.0846 | +9.6438 | .9532 |
| 17 | φ Geminor. | 5 | — 1 | —63 | 0 58.0 | — 8 59 5 | —0.7773 | .5451 | —.0967 | +9.6590 | .9494 |
| 17 | $\omega^1$ Cancri | 6 | +67 | — 6 | 4 19.6 | — 5 44 24 | +0.3599 | .5485 | —.1038 | +9.6685 | .9545 |
| 17 | $\omega^2$ Cancri | 6½ | +90 | + 9 | 4 41.8 | — 5 22 58 | +0.6486 | .5498 | —.1068 | +9.6337 | .9555 |
| 17 | $\psi^1$ Cancri | 6½ | + 9 | —59 | 7 30.4 | — 2 42 24 | —0.6194 | .5421 | —.1129 | +9.6460 | .9527 |
| 17 | $\psi^2$ Cancri | 4 | +28 | —39 | 8 37.6 | — 1 35 17 | —0.2788 | .5435 | —.1129 | +9.6410 | .9538 |
| 17 | λ Cancri | 6 | +90 | +15 | 13 15.4 | + 2 53 4 | +0.7775 | .5446 | —.1240 | +9.6173 | .9591 |
| 17 | $\upsilon^1$ Cancri | 7 | +35 | —35 | 16 4.8 | + 5 35 52 | —0.1582 | .5390 | —.1305 | +9.6260 | .9573 |
| 17 | $\upsilon^2$ Cancri | 6½ | +52 | —20 | 16 58.4 | + 6 28 37 | +0.1435 | .5395 | —.1326 | +9.6197 | .9586 |
| 17 | B.A.C. 2840 | 7 | +36 | —34 | 17 27.5 | + 6 56 44 | —0.1407 | .5388 | —.1326 | +9.6230 | .9579 |
| 17 | $\upsilon^3$ Cancri | 6 | +55 | —26 | 18 19.3 | + 7 46 46 | +0.0251 | .5385 | —.1347 | +9.6188 | .9588 |
| 17 | 32 Cancri | 7 | +40 | —31 | 19 1.7 | + 8 27 52 | —0.0775 | .5374 | —.1368 | +9.6189 | .9588 |
| 18 | ξ Cancri | 5 | +12 | —63 | 12 19.5 | + 1 11 52 | —0.5957 | .5246 | —.1694 | +9.5851 | .9652 |
| 18 | 79 Cancri | 6 | +14 | —60 | 12 48.5 | + 1 39 53 | —0.5462 | .5249 | —.1695 | +9.5843 | .9654 |
| 18 | B.A.C. 3138 | 6 | +37 | —38 | 14 25.2 | + 3 13 35 | —0.1285 | .5252 | —.1730 | +9.5712 | .9676 |
| 19 | η Leonis | 3½ | +15 | —67 | 17 38.4 | + 5 37 11 | —0.5492 | .5069 | —.2128 | +9.4772 | .9795 |
| 20 | 42 Leonis | 6 | +30 | —52 | 1 19.2 | —10 55 24 | —0.2699 | .5030 | —.2220 | +9.4323 | .9835 |
| 20 | B.A.C. 3579 | 6 | +22 | —61 | 5 3.2 | — 7 17 47 | —0.4156 | .5006 | —.2263 | +9.4151 | .9848 |
| 20 | i Leonis | 6 | +13 | —72 | 6 52.8 | — 5 31 18 | —0.6046 | .4990 | —.2283 | +9.4094 | .9852 |
| 20 | l Leonis | 5 | +90 | —28 | 16 9.5 | + 3 29 46 | +1.1984 | .4980 | —.2364 | +9.2923 | .9915 |
| 22 | B.A.C. 3996 | 6 | —24 | —84 | 1 47.3 | —11 46 55 | —1.2139 | 0.4843 | —.2551 | +9 0186 | 9.9976 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Feb. 22 | *b* Virginis | 6 | —15 | —86 | 7 59.3 | — 5 44 44 | —1.0917 | 0.4833 | —.2568 | +8.8902 | 9.9987 |
| 22 | 10 Virginis | 6 | +14 | —80 | 13 34.7 | — 0 18 14 | —0.5843 | .4878 | —.2578 | +8.6736 | 9.9995 |
| 22 | 13 Virginis | 6 | +90 | +14 | 18 44.2 | + 4 43 11 | +1.0757 | .4831 | —.2583 | +6.2538 | 0.0000 |
| 22 | *η* Virginis | 3½ | +90 | — 5 | 19 27.3 | + 5 25 5 | +0.7566 | .4827 | —.2583 | +7.3577 | 0.0000 |
| 23 | 38 Virginis | 6 | — 6 | —90 | 14 33.8 | + 0 1 29 | —0.9513 | .4843 | —.2568 | —8.6846 | 9.9995 |
| 24 | *θ* Virginis | 4½ | —22 | —90 | 0 3.7 | + 9 16 17 | —1.1612 | .4866 | —.2540 | —8.9201 | .9985 |
| 24 | *h* Virginis | 6 | +79 | — 5 | 12 56.5 | — 2 11 42 | +0.7466 | .4888 | —.2481 | —9.2142 | .9941 |
| 26 | B.A.C. 4896 | 6 | +15 | —69 | 6 42.0 | — 9 37 30 | —0.4196 | .5127 | —.2116 | —9.4707 | .9802 |
| 26 | *ι*¹ Libræ | 4½ | +20 | —60 | 16 56.5 | + 0 18 21 | —0.2766 | .5213 | —.1968 | —9.5180 | .9750 |
| 26 | *ι*² Libræ | 6½ | + 7 | —79 | 17 29.2 | + 0 49 54 | —0.5405 | .5217 | —.1967 | —9.5148 | .9754 |
| 27 | B.A.C. 5254 | 6 | +66 | — 1 | 12 45.1 | — 4 31 24 | +0.7755 | .5327 | —.1650 | —9.6015 | .9622 |
| 27 | *δ* Scorpii | 2½ | —34 | —90 | 15 38.7 | — 1 43 40 | —1.1282 | .5425 | —.1593 | —9.5775 | .9665 |
| 27 | B.A.C. 5335 | 6½ | + 6 | —73 | 18 14.6 | + 0 46 58 | —0.4519 | .5430 | —.1535 | —9.5957 | .9633 |
| 27 | B.A.C. 5354 | 6½ | + 2 | —80 | 19 25.7 | + 1 55 38 | —0.5353 | .5442 | —.1514 | —9.5973 | .9631 |
| 28 | 19 Scorpii | 5½ | —12 | —90 | 0 44.2 | + 7 3 12 | —0.7598 | .5492 | —.1409 | —9.6062 | .9613 |
| 28 | *σ* Scorpii | 3½ | +64 | — 3 | 0 56.0 | + 7 14 34 | +0.7364 | .5448 | —.1389 | —9.6299 | .9564 |
| 28 | *α* Scorpii | 1½ | +64 | +30 | 4 32.3 | +10 43 20 | +1.1687 | .5446 | —.1322 | —9.6436 | .9532 |
| 28 | 22 Scorpii | 5 | +12 | —61 | 4 55.5 | +11 5 45 | —0.2835 | .5514 | —.1309 | —9.6226 | .9580 |
| 28 | 25 Scorpii | 6 | —10 | —90 | 12 6.9 | — 5 58 19 | —0.6650 | .5601 | —.1137 | —9.6303 | .9563 |
| 28 | B.A.C. 5800 | 6½ | +13 | —55 | 23 35.9 | + 5 5 24 | —0.1770 | .5666 | —.0859 | —9.6442 | .9506 |
| 29 | A Ophiuchi | 5 | —13 | —90 | 0 6.5 | + 5 34 49 | —0.6645 | .5702 | —.0833 | —9.6478 | .9522 |
| 29 | 38 Ophiuchi | 6½ | —12 | —90 | 1 1.5 | + 6 27 47 | —0.6552 | .5709 | —.0806 | —9.6490 | .9519 |
| 29 | 43 Ophiuchi | 6 | +62 | + 1 | 3 19.5 | + 8 40 33 | +0.7764 | .5652 | —.0752 | —9.6716 | .9459 |
| 29 | 3 Sagittarii | 5 | +15 | —48 | 13 8.7 | — 5 52 51 | —0.0679 | .5768 | —.0471 | —9.6684 | .9469 |
| 29 | B.A.C. 6024 | 6½ | —31 | —90 | 14 17.0 | — 4 47 11 | —0.9147 | .5813 | —.0442 | —9.6574 | .9498 |
| 29 | B.A.C. 6063 | 6½ | +20 | —41 | 16 47.3 | — 2 22 47 | +0.0565 | .5778 | —.0368 | —9.6722 | .9458 |
| 29 | B.A.C. 6072 | 6½ | +61 | 0 | 17 32.3 | — 1 39 31 | +0.7540 | .5746 | —.0353 | —9.6819 | .9429 |
| 29 | B.A.C. 6120 | 6½ | +38 | —23 | 20 46.1 | + 1 26 37 | +0.3799 | .5780 | —.0264 | —9.6783 | .9440 |
| 29 | B.A.C. 6127 | 5 | +36 | —23 | 21 16.8 | + 1 56 7 | +0.3663 | .5788 | —.0234 | —9.6782 | .9440 |
| March 1 | B.A.C. 6190 | 6½ | +46 | —14 | 0 56.2 | + 5 26 47 | +0.5340 | .5804 | —.0113 | —9.6814 | .9431 |
| 1 | B.A.C. 6191 | 6½ | +23 | —35 | 0 56.4 | + 5 27 1 | +0.1536 | .5824 | —.0113 | —9.6763 | .9446 |
| 1 | B.A.C. 6194 | 5½ | —49 | —90 | 1 14.5 | + 5 44 24 | —1.1319 | .5888 | —.0113 | —9.6584 | .9495 |
| 1 | B.A.C. 6220 | 6½ | +32 | —27 | 2 44.8 | + 7 1 6 | +0.3075 | .5815 | —.0082 | —9.6786 | .9439 |
| 1 | *φ* Sagittarii | 3½ | —40 | —90 | 11 58.6 | — 7 57 19 | —1.0254 | .5929 | +.0230 | —9.6590 | .9494 |
| 1 | *τ* Sagittarii | 3½ | +19 | —43 | 20 10.1 | — 0 5 49 | +0.0228 | .5891 | +.0483 | —9.6698 | .9464 |
| 2 | B.A.C. 6628 | 6 | +60 | — 5 | 2 54.0 | + 6 22 36 | +0.6817 | .5865 | +.0704 | —9.6736 | .9454 |
| 2 | B.A.C. 6666 | 6 | +18 | —47 | 4 58.5 | + 8 21 6 | —0.0458 | .5907 | +.0768 | —9.6611 | .9488 |
| 2 | *ω* Sagittarii | 5½ | +37 | —30 | 14 56.9 | — 6 5 0 | +0.2549 | .5884 | +.1078 | —9.6522 | .9511 |
| 2 | *b* Sagittarii | 5 | +63 | +33 | 15 22.0 | — 5 40 55 | +1.1781 | .5837 | +.1079 | —9.6651 | .9477 |
| 2 | A Sagittarii | 5 | +39 | —28 | 16 9.5 | — 4 55 17 | +0.2894 | .5883 | +.1109 | —9.6508 | .9515 |
| 3 | B.A.C. 7077 | 6 | +65 | + 3 | 5 18.1 | + 7 41 20 | +0.8343 | .5826 | +.1493 | —9.6329 | .9557 |
| 3 | B.A.C. 7197 | 6 | +11 | —66 | 11 24.1 | —10 27 22 | —0.3567 | .5864 | +.1661 | —9.5965 | .9632 |
| 3 | B.A.C. 7237 | 6 | +66 | +13 | 13 12.1 | — 8 43 38 | +0.9902 | .5796 | +.1716 | —9.6148 | .9597 |
| 3 | B.A.C. 7335 | 6 | + 9 | —72 | 19 23.6 | — 2 46 55 | —0.4377 | .5836 | +.1873 | —9.5693 | .9679 |
| 3 | 27 Capricor. | 6 | —23 | —90 | 19 47.3 | — 2 24 5 | —0.9968 | .5860 | +.1872 | —9.5570 | .9698 |
| 3 | *φ* Capricor. | 6 | +11 | —70 | 22 12.9 | — 0 4 13 | —0.4177 | .5818 | +.1948 | —9.5592 | .9694 |
| 4 | 33 Capricor. | 6 | +58 | —19 | 1 37.4 | + 3 12 14 | +0.4713 | .5772 | +.2021 | —9.5633 | .9688 |
| 4 | 35 Capricor. | 6 | +68 | +18 | 2 51.5 | + 4 23 29 | +1.0649 | .5744 | +.2044 | —9.5699 | .9678 |
| 4 | 37 Capricor. | 6 | +68 | —10 | 5 56.5 | + 7 21 19 | +0.6386 | .5736 | +.2136 | —9.5489 | .9709 |
| 4 | *ι* Capricor. | 4½ | +46 | —32 | 6 51.1 | + 8 13 46 | +0.2245 | .5744 | + 2137 | —9.5363 | .9727 |
| 4 | *κ* Capricor. | 5 | +41 | —37 | 9 6.6 | +10 24 4 | +0.1347 | .5740 | +.2202 | —9.5240 | .9743 |
| 4 | B.A.C. 7550 | 6 | +70 | + 7 | 9 20.0 | +10 36 56 | +0.9133 | .5711 | +.2202 | —9.5398 | .9722 |
| 7 | B.A.C. 274 | 6½ | —19 | —84 | 22 39.8 | — 3 6 25 | —1.1513 | .5440 | +.2889 | +8.9974 | .9978 |
| 8 | 73 Piscium | 6½ | +61 | —28 | 0 55.9 | — 0 55 3 | +0.3099 | .5453 | +.2872 | +8.9300 | .9984 |
| 8 | 77 Piscium *pr.* | 7 | +90 | +21 | 1 21.8 | — 0 29 60 | +1.1636 | 0.5460 | +.2871 | +8.8585 | 9.9989 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | | At Washington Mean Time of Conjunction. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | | *H* | | | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. | m. | h. | m. | s. | | | | | |
| March 8 | *e* Piscium | 5½ | +90 | — 4 | 2 | 31.1 | + 0 | 36 | 57 | +0.7619 | 0.5458 | +.2866 | +8.9304 | 9.9984 |
| 8 | ζ Piscium | 6 | +21 | —70 | 4 | 52.8 | + 2 | 53 | 45 | —0.4603 | .5449 | +.2846 | +9.0742 | .9969 |
| 8 | 88 Piscium | 6½ | +57 | —31 | 5 | 20.0 | + 3 | 20 | 0 | +0.2402 | .5456 | +.2845 | +9.0357 | .9974 |
| 8 | 54 Ceti | 6 | +87 | — 8 | 21 | 26.8 | — 5 | 6 | 36 | +0.6645 | .5483 | +.2692 | +9.2536 | .9929 |
| 9 | 40 Arietis | 6 | +26 | —55 | 22 | 38.6 | — 4 | 47 | 51 | —0.3488 | .5517 | +.2316 | +9.4825 | .9790 |
| 9 | π Arietis | 5½ | +80 | — 8 | 22 | 59.3 | — 4 | 27 | 54 | +0.5567 | .5548 | +.2297 | +9.4626 | .9809 |
| 10 | ρ² Arietis | 6 | +62 | —21 | 1 | 47.3 | — 1 | 53 | 53 | +0.3059 | .5549 | +.2261 | +9.4841 | .9788 |
| 10 | ρ³ Arietis | 6 | +89 | — 3 | 2 | 2.7 | — 1 | 39 | 5 | +0.6500 | .5563 | +.2241 | +9.4772 | .9795 |
| 10 | 54 Arietis | 6½ | +90 | +19 | 7 | 10.1 | + 3 | 17 | 20 | +0.9936 | .5591 | +.2144 | +9.4956 | .9776 |
| 10 | δ Arietis | 4½ | +64 | —18 | 8 | 32.8 | + 4 | 45 | 0 | +0.3367 | .5574 | +.2125 | +9.5166 | .9752 |
| 10 | ζ Arietis | 4½ | + 5 | —70 | 9 | 55.9 | + 6 | 5 | 8 | —0.7196 | .5545 | +.2083 | +9.5445 | .9715 |
| 10 | B.A.C. 1032 | 6½ | +64 | —17 | 12 | 28.7 | + 8 | 32 | 27 | +0.3375 | .5586 | +.2041 | +9.5338 | .9730 |
| 10 | τ¹ Arietis | 5 | +29 | —48 | 12 | 37.3 | + 8 | 40 | 39 | —0.2828 | .5563 | +.2041 | +9.5469 | .9712 |
| 10 | τ² Arietis | 6 | +59 | —20 | 13 | 17.1 | + 9 | 19 | 5 | +0.2590 | .5585 | +.2019 | +9.5387 | .9723 |
| 10 | 65 Arietis | 6 | +64 | —16 | 13 | 59.5 | + 9 | 59 | 51 | +0.3337 | .5595 | +.1998 | +9.5401 | .9722 |
| 10 | 9 Tauri | 6 | —24 | —67 | 19 | 15.1 | — 8 | 55 | 59 | —1.1295 | .5555 | +.1888 | +9.5871 | .9649 |
| 10 | 7 Pleiadum | 8 | —49 | —66 | 22 | 58.7 | — 5 | 20 | 36 | —1.3164 | .5558 | +.1796 | +9.6022 | .9621 |
| 10 | B.A.C. 1155 | 7 | +22 | —52 | 22 | 58.9 | — 5 | 20 | 24 | —0.4035 | .5595 | +.1796 | +9.5864 | .9650 |
| 10 | *d* Pleiadum | 5 | —31 | —67 | 23 | 10.6 | — 5 | 9 | 7 | —1.1976 | .5563 | +.1796 | +9.6007 | .9624 |
| 10 | 11 Pleiadum | 8½ | —56 | —66 | 23 | 18.7 | — 5 | 1 | 21 | —1.3332 | .5556 | +.1796 | +9.6034 | .9619 |
| 10 | 13 Pleiadum | 8½ | —29 | —67 | 23 | 29.3 | — 4 | 51 | 8 | —1.1841 | .5560 | +.1796 | +9.6015 | .9622 |
| 10 | 14 Pleiadum | 9 | — 9 | —67 | 23 | 31.8 | — 4 | 48 | 42 | —0.9425 | .5572 | +.1796 | +9.5975 | .9630 |
| 10 | 15 Pleiadum | 8½ | —46 | —66 | 23 | 34.3 | — 4 | 46 | 17 | —1.3062 | .5556 | +.1796 | +9.6038 | .9618 |
| 10 | 16 Pleiadum | 9½ | —13 | —67 | 23 | 34.8 | — 4 | 45 | 49 | —0.9895 | .5569 | +.1796 | +9.5985 | .9628 |
| 10 | 17 Pleiadum | 8 | — 6 | —67 | 23 | 35.4 | — 4 | 45 | 15 | —0.8912 | .5573 | +.1795 | +9.5968 | .9631 |
| 10 | 18 Pleiadum | 8 | —48 | —66 | 23 | 35.5 | — 4 | 45 | 9 | —1.3140 | .5555 | +.1795 | +9.6041 | .9617 |
| 10 | *p* Pleiadum | 7½ | —43 | —67 | 23 | 36.3 | — 4 | 44 | 25 | —1.2885 | .5558 | +.1794 | +9.6036 | .9618 |
| 10 | 19 Pleiadum | 8 | 0 | —67 | 23 | 36.7 | — 4 | 44 | 3 | —0.7965 | .5578 | +.1794 | +9.5952 | .9634 |
| 10 | 22 Pleiadum | 8 | —20 | —67 | 23 | 38.0 | — 4 | 42 | 48 | —1.0802 | .5568 | +.1792 | +9.6002 | .9625 |
| 10 | 23 Pleiadum | 8½ | —12 | —67 | 23 | 39.3 | — 4 | 41 | 29 | —0.8314 | .5578 | +.1792 | +9.5960 | .9633 |
| 10 | η Tauri | 3 | —39 | —67 | 23 | 39.7 | — 4 | 41 | 10 | —1.2671 | .5559 | +.1791 | +9.6035 | .9618 |
| 10 | 25 Pleiadum | 8½ | + 3 | —66 | 23 | 43.5 | — 4 | 37 | 27 | —0.7494 | .5581 | +.1790 | +9.5948 | .9635 |
| 10 | 26 Pleiadum | 9 | + 7 | —66 | 23 | 46.1 | — 4 | 34 | 59 | —0.6736 | .5585 | +.1789 | +9.5937 | .9637 |
| 11 | 28 Pleiadum | 7 | +17 | —58 | 0 | 2.0 | — 4 | 19 | 41 | —0.5041 | .5592 | +.1782 | +9.5915 | .9641 |
| 11 | *s* Pleiadum | 7½ | — 7 | —67 | 0 | 16.8 | — 4 | 5 | 22 | —0.9087 | .5574 | +.1778 | +9.5992 | .9627 |
| 11 | *f* Pleiadum | 4½ | —21 | —67 | 0 | 22.2 | — 4 | 0 | 11 | —1.0937 | .5567 | +.1773 | +9.6026 | .9620 |
| 11 | *h* Pleiadum | 5½ | —29 | —66 | 0 | 22.6 | — 3 | 59 | 50 | —1.1781 | .5564 | +.1773 | +9.6041 | .9617 |
| 11 | 30 Pleiadum | 8½ | — 8 | —67 | 0 | 23.3 | — 3 | 59 | 5 | —0.9202 | .5576 | +.1773 | +9.5997 | .9626 |
| 11 | 33 Pleiadum | 8½ | —41 | —66 | 0 | 28.6 | — 3 | 53 | 59 | —1.2750 | .5562 | +.1770 | +9.6060 | .9614 |
| 11 | 34 Pleiadum | 7½ | + 5 | —67 | 0 | 36.7 | — 3 | 46 | 11 | —0.7039 | .5586 | +.1770 | +9.5967 | .9632 |
| 11 | 35 Pleiadum | 9 | —37 | —66 | 0 | 37.1 | — 3 | 45 | 53 | —1.2474 | .5560 | +.1773 | +9.6060 | .9614 |
| 11 | 36 Pleiadnm | 9 | —32 | —66 | 0 | 40.8 | — 3 | 42 | 14 | —1.2086 | .5562 | +.1773 | +9.6055 | .9615 |
| 11 | 38 Pleiadum | 8 | — 2 | —67 | 0 | 42.6 | — 3 | 40 | 34 | —0 8268 | .5577 | +.1773 | +9.5991 | .9627 |
| 11 | B.A.C. 1189 | 7 | +90 | +12 | 0 | 43.5 | — 3 | 39 | 40 | +0.8190 | .5643 | +.1773 | +9.5699 | .9678 |
| 11 | 40 Pleiadum | 7½ | — 5 | —67 | 1 | 5.1 | — 3 | 18 | 49 | —0.8790 | .5580 | +.1773 | +9.6011 | .9623 |
| 11 | 32 Tauri | 6 | +90 | +29 | 3 | 37.7 | — 0 | 51 | 52 | +1.0593 | .5661 | +.1701 | +9.5947 | .9670 |
| 11 | 33 Tauri | 6 | +66 | —12 | 3 | 42.0 | + 0 | 12 | 13 | +0.3592 | .5634 | +.1701 | +9.5875 | .9648 |
| 11 | 36 Tauri | 6½ | +38 | —35 | 6 | 43.6 | + 2 | 7 | 7 | —0.1182 | .5619 | +.1627 | +9.6044 | .9617 |
| 11 | χ Tauri | 5½ | +11 | —60 | 14 | 15.8 | + 9 | 22 | 29 | —0.5987 | 5623 | +.1426 | +9.6306 | .9563 |
| 12 | B.A.C. 1648 | 6½ | +12 | —54 | 14 | 14.8 | + 8 | 27 | 16 | —0.5758 | .5652 | +.0775 | +9.6689 | .9467 |
| 12 | β Tauri | 2 | —28 | —62 | 16 | 24.0 | +10 | 31 | 39 | —1.1249 | .5623 | +.0718 | +9.6784 | .9440 |
| 12 | B.A.C. 1746 | 6½ | +50 | —14 | 20 | 23.2 | — 9 | 38 | 16 | +0.1020 | .5685 | +.0605 | +9.6654 | .9477 |
| 13 | 136 Tauri | 5 | +75 | + 6 | 3 | 32.5 | — 2 | 45 | 10 | +0.4536 | .5695 | +.0406 | +9.6655 | .9476 |
| 13 | B A.C. 1882 | 6½ | —11 | —61 | 4 | 50.1 | — 1 | 30 | 27 | —0.9172 | .5630 | +.0201 | +9.6844 | .9422 |
| 13 | B.A.C. 2097 | 6½ | +42 | —16 | 18 | 52.2 | —11 | 59 | 59 | —0 0371 | 0.5635 | —.0046 | +9.6760 | 9.9447 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Mar. 13 | 49 Aurigæ | 5½ | +52 | − 8 | 20 53.7 | −10 2 56 | +0.1359 | 0.5635 | −.0102 | +9.6735 | 9.9454 |
| 13 | 53 Aurigæ | 6½ | −11 | −61 | 22 12.0 | − 8 47 30 | −0.9194 | .5578 | −.0129 | +9.6870 | .9414 |
| 13 | 54 Aurigæ | 6 | +35 | −24 | 22 42.7 | − 8 17 58 | −0.1592 | .5618 | −.0130 | +9.6771 | .9444 |
| 14 | 28 Geminor. | 6 | −15 | −61 | 0 52.8 | − 6 12 45 | −0.9739 | .5565 | −.0212 | +9.6872 | .9413 |
| 14 | 47 Geminor. | 6 | +90 | +23 | 12 14.8 | + 4 44 19 | +0.7982 | .5609 | −.0508 | +9.6584 | .9495 |
| 14 | 53 Geminor. | 6 | +19 | −44 | 14 10.6 | + 6 35 57 | −0.4410 | .5539 | −.0560 | +9.6737 | .9453 |
| 14 | 59 Geminor. | 6½ | +21 | −43 | 17 53.9 | +10 11 12 | −0.4154 | .5518 | −.0662 | +9.6704 | .9463 |
| 14 | ι Geminor. | 4 | + 8 | −57 | 18 24.7 | +10 40 58 | −0.6314 | .5509 | −.0663 | +9.6728 | .9456 |
| 14 | $b^1$ Geminor. | 5½ | −25 | −62 | 19 57.9 | −11 49 13 | −1.0962 | .5474 | −.0714 | +9.6775 | .9442 |
| 14 | $b^2$ Geminor. | 5½ | − 9 | −62 | 20 10.3 | −11 37 18 | −0.8927 | .5487 | −.0715 | +9.6746 | .9451 |
| 14 | B.A.C. 2472 | 6 | −11 | −62 | 20 32.9 | −11 15 30 | −0.9209 | .5487 | −.0716 | +9.6746 | .9451 |
| 14 | υ Geminor. | 5 | +43 | −22 | 22 52.5 | − 9 0 48 | −0.0139 | .5518 | −.0790 | +9.6577 | .9497 |
| 15 | *c* Geminor. | 6 | +90 | +15 | 2 30.5 | − 5 30 32 | +0.8674 | .5533 | −.0864 | +9.6438 | .9532 |
| 15 | φ Geminor. | 5 | +10 | −57 | 6 38.5 | − 1 31 8 | −0.6090 | .5444 | −.0960 | +9.6590 | .9494 |
| 15 | $\omega^1$ Cancri | 6 | +80 | + 3 | 10 0.2 | + 1 43 33 | +0.5224 | .5468 | −.1051 | +9.6385 | .9545 |
| 15 | $\omega^2$ Cancri | 6½ | +90 | +19 | 10 22.4 | + 2 5 1 | +0.8126 | .5481 | − 1054 | +9.6337 | .9555 |
| 15 | $\psi^1$ Cancri | 6½ | +19 | −50 | 14 11.2 | + 5 45 57 | −0.4588 | .5401 | −.1145 | +9.6460 | .9527 |
| 15 | $\psi^2$ Cancri | 4 | +37 | −31 | 14 18.4 | + 5 52 55 | −0.1206 | .5415 | −.1145 | +9.6412 | .9538 |
| 15 | λ Cancri | 6 | +90 | +24 | 18 56.7 | +10 21 48 | +0.9294 | .5423 | −.1255 | +9.6173 | .9591 |
| 15 | $\upsilon^1$ Cancri | 7 | +44 | −27 | 21 44.6 | −10 56 1 | −0.0088 | .5379 | −.1298 | +9.6260 | .9573 |
| 15 | $\upsilon^2$ Cancri | 6½ | +62 | −12 | 22 40.3 | −10 2 6 | +0.2918 | .5383 | −.1319 | +9 6197 | .9586 |
| 15 | B.A.C. 2840 | 7 | +45 | −27 | 23 9.5 | − 9 33 53 | +0.0071 | .5363 | −.1340 | +9.6230 | .9579 |
| 16 | $\upsilon^3$ Cancri | 6 | +54 | −19 | 0 1.4 | − 8 43 41 | +0.1718 | .5362 | −.1361 | +9.6188 | .9588 |
| 16 | 32 Cancri | 7 | +48 | −24 | 0 43.1 | − 8 3 27 | +0.0683 | .5363 | −.1361 | +9.6189 | .9588 |
| 16 | ξ Cancri | 5 | +19 | −56 | 18 6.3 | + 8 46 6 | −0.4723 | .5218 | −.1704 | +9.5852 | .9652 |
| 16 | 79 Cancri | 6 | +17 | −58 | 18 35.4 | + 9 14 17 | −0.5034 | .5220 | −.1704 | +9.5843 | .9654 |
| 16 | B.A.C. 3138 | 6 | +44 | −32 | 20 12.7 | +10 48 29 | −0.0083 | .5188 | −.1738 | +9.5712 | .9676 |
| 17 | η Leonis | 3½ | +19 | −62 | 23 36.4 | −10 37 24 | −0.4729 | .5046 | −.2135 | +9.4772 | .9795 |
| 18 | 42 Leonis | 6 | +33 | −49 | 7 19.7 | − 3 7 29 | −0.2046 | .5097 | −.2227 | +9.4323 | .9835 |
| 18 | B.A.C. 3579 | 6 | +26 | −58 | 11 4.9 | + 0 31 22 | −0.3569 | .4984 | −.2248 | +9.4152 | .9848 |
| 18 | *i* Leonis | 6 | +16 | −69 | 12 54.0 | + 2 17 23 | −0.5444 | .4968 | −.2289 | +9.4093 | .9852 |
| 18 | *l* Leonis | 5 | +90 | +31 | 22 14.5 | +11 22 15 | +1.2399 | .4961 | −.2372 | +9.2923 | .9915 |
| 20 | B.A.C. 3996 | 6 | −26 | −84 | 7 57.8 | − 3 48 58 | −1.2291 | .4834 | −.2567 | +9.0186 | .9976 |
| 20 | *b* Virginis | 6 | −17 | −86 | 14 10.1 | + 2 13 30 | −1.1192 | .4833 | −.2586 | +8.8902 | .9987 |
| 20 | 10 Virginis | 6 | +13 | −83 | 19 45.3 | + 7 39 54 | −0.6200 | .4834 | −.2595 | +8.6736 | .9995 |
| 21 | 13 Virginis | 6 | +90 | +11 | 0 54.9 | −11 18 39 | +1.0318 | .4836 | −.2603 | +6.2654 | .0000 |
| 21 | η Virginis | 3½ | +90 | − 8 | 1 37.9 | −10 36 45 | +0.7114 | .4835 | −.2603 | +7.3586 | .0000 |
| 21 | 38 Virginis | 6 | −11 | −90 | 20 42.4 | + 7 57 32 | −1.0252 | .4849 | −.2590 | −8.6846 | .9995 |
| 22 | θ Virginis | 4½ | −29 | −90 | 6 11.1 | − 6 48 49 | −1.2491 | .4880 | −.2561 | −8.9201 | .9985 |
| 22 | *h* Virginis | 6 | +79 | −11 | 19 1.9 | + 5 41 12 | +0.6439 | .4903 | −.2501 | −9.2142 | .9941 |
| 23 | 86 Virginis | 6 | +78 | +48 | 1 9.4 | +11 36 59 | +1.3951 | .4919 | −.2459 | −9.3073 | .9909 |
| 24 | B.A.C. 4896 | 6 | + 8 | −80 | 12 44.8 | − 1 47 13 | −0.5608 | .5136 | −.2126 | −9.4707 | .9802 |
| 24 | $\iota^1$ Libræ | 4½ | +13 | −70 | 23 1.1 | + 8 10 18 | −0.4225 | .5214 | −.1975 | −9.5180 | .9750 |
| 24 | $\iota^2$ Libræ | 6½ | + 1 | −90 | 23 33.8 | + 8 41 58 | −0.6883 | .5219 | −.1975 | −9.5148 | .9754 |
| 25 | B.A.C. 5253 | 6 | +66 | +37 | 18 50.5 | + 3 21 40 | +1.2503 | .5292 | −.1834 | −9.6111 | .9604 |
| 25 | B.A.C. 5254 | 6 | +64 | − 9 | 18 52.4 | + 3 23 26 | +0.6424 | .5330 | −.1635 | −9.6015 | .9622 |
| 25 | B.A.C. 5286 | 6½ | +66 | +38 | 21 0.3 | + 5 27 6 | +1.2448 | .5321 | −.1596 | −9.6164 | .9593 |
| 25 | δ Scorpii | 2½ | −52 | −90 | 21 52.2 | + 6 17 17 | −1.2877 | .5302 | −.1577 | −9.5775 | .9665 |
| 26 | B.A.C. 5335 | 6½ | − 2 | −87 | 0 29.6 | + 8 49 27 | −0.8070 | .5287 | −.1536 | −9.5957 | .9633 |
| 26 | B.A.C. 5354 | 6½ | − 8 | −90 | 1 41.5 | + 9 58 52 | −0.6923 | .5421 | −.1448 | −9.5973 | .9631 |
| 26 | 19 Scorpii | 5½ | −22 | −90 | 7 3.6 | − 8 49 54 | −0.9181 | .5476 | −.1394 | −9.6063 | .9613 |
| 26 | σ Scorpii | 3½ | +59 | −12 | 7 16.2 | − 8 37 47 | +0.5892 | .5419 | −.1391 | −9.6297 | .9564 |
| 26 | α Scorpii | 1½ | +64 | +17 | 10 54.8 | − 5 6 43 | +1.0266 | .5415 | −.1307 | −9.6436 | .9532 |
| 26 | 22 Scorpii | 5 | + 4 | −72 | 11 18.4 | − 4 43 57 | −0.4383 | .5487 | −.1303 | −9.6226 | .9580 |
| 26 | 25 Scorpii | 6 | −19 | −90 | 18 35.5 | + 2 17 49 | −0.8222 | 0.5556 | −.1141 | −9.6303 | 9.9563 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. |  | At Washington Mean Time of Conjunction. |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  |  | H |  |  | Y | p′ | q′ | Log sin D | Log cos D |
|  |  |  | ° | ° | h. | m. | h. | m. | s. |  |  |  |  |  |
| Mar. 27 | B.A.C. 5800 | 6½ | +5 | −65 | 6 | 17.3 | −10 | 25 | 40 | −0.3293 | 0.5609 | −.0843 | −9.6542 | 9.9506 |
| 27 | A Ophiuchi | 5 | −22 | −90 | 6 | 48.5 | −9 | 55 | 40 | −0.8211 | .5656 | −.0828 | −9.6478 | .9522 |
| 27 | 38 Ophiuchi | 6½ | −21 | −90 | 7 | 44.5 | −9 | 1 | 41 | −0.8128 | .5656 | −.0817 | −9.6490 | .9519 |
| 27 | 43 Ophiuchi | 6 | +56 | −9 | 10 | 5.4 | −6 | 45 | 58 | +0.6212 | .5601 | −.0738 | −9.6716 | .9459 |
| 27 | 3 Sagittarii | 5 | +7 | −57 | 20 | 7.8 | +2 | 53 | 54 | −0.2161 | .5703 | −.0463 | −9.6684 | .9469 |
| 27 | B.A.C. 6024 | 6½ | −42 | −90 | 21 | 17.9 | +4 | 1 | 17 | −1.0735 | .5746 | −.0435 | −9.6572 | .9498 |
| 27 | B.A.C. 6063 | 6½ | +13 | −50 | 23 | 51.9 | +6 | 29 | 29 | −0.0887 | .5713 | −.0727 | −9.6722 | .9458 |
| 28 | B.A.C. 6072 | 6½ | +54 | −9 | 0 | 38.3 | +7 | 14 | 6 | +0.6183 | .5679 | −.0341 | −9.6819 | .9429 |
| 28 | B A.C. 6120 | 6½ | +29 | −31 | 3 | 57.0 | +10 | 25 | 12 | +0.2404 | .5712 | −.0252 | −9.6783 | .9440 |
| 28 | B.A.C. 6127 | 5 | +28 | −31 | 4 | 28.6 | +10 | 55 | 33 | +0.2265 | .5713 | −.0234 | −9.6782 | .9440 |
| 28 | B.A.C. 6190 | 6½ | +37 | −22 | 8 | 13.8 | −19 | 27 | 53 | +0.3985 | .5724 | −.0117 | −9.6814 | .9431 |
| 28 | B.A.C. 6191 | 6½ | +16 | −44 | 8 | 14.1 | −9 | 27 | 39 | +0.0130 | .5743 | −.0117 | −9.6763 | .9446 |
| 28 | B.A.C. 6220 | 6½ | +24 | −35 | 10 | 5.5 | −7 | 40 | 32 | +0.1698 | .5742 | −.0058 | −9.6786 | .9439 |
| 28 | φ Sagittarii | 3½ | −52 | −90 | 19 | 35.6 | +1 | 27 | 21 | −1.1790 | .5836 | +.0211 | −9.6591 | .9494 |
| 29 | τ Sagittarii | 3½ | +13 | −51 | 4 | 2.5 | +11 | 34 | 18 | −0.1115 | .5798 | +.0483 | −9.6698 | .9464 |
| 29 | B.A.C. 6628 | 6 | +52 | −12 | 10 | 59.6 | −7 | 44 | 57 | +0.5621 | .5766 | +.0694 | −9.6736 | .9454 |
| 29 | B.A.C. 6666 | 6 | +12 | −55 | 13 | 8.4 | −5 | 41 | 15 | −0.1758 | .5805 | +.0754 | −9.6611 | .9488 |
| 29 | ω Sagittarii | 5½ | +30 | −37 | 23 | 27.4 | +4 | 13 | 21 | +0.1363 | .5780 | +.1050 | −9.6522 | .9511 |
| 29 | b Sagittarii | 5 | +63 | +22 | 23 | 53.4 | +4 | 38 | 19 | +1.0742 | .5731 | +.1067 | −9.6651 | .9477 |
| 30 | A Sagittarii | 5 | +33 | −35 | 0 | 42.6 | +5 | 25 | 38 | +0.1717 | .5780 | +.1091 | −9.6508 | .9515 |
| 30 | B.A.C. 7077 | 6 | +64 | −3 | 14 | 19.0 | −5 | 29 | 48 | +0.7707 | .5720 | +.1473 | −9.6329 | .9557 |
| 30 | B.A.C. 7197 | 6 | +4 | −76 | 20 | 37.7 | +0 | 34 | 13 | −0.4839 | .5758 | +.1633 | −9.5965 | .9632 |
| 30 | B.A.C. 7237 | 6 | +66 | +7 | 22 | 29.8 | +2 | 22 | 0 | +0.9005 | .5691 | +.1684 | −9.6147 | .9597 |
| 31 | B.A.C. 7335 | 6 | +3 | −80 | 4 | 54.1 | +8 | 31 | 38 | −0.5441 | .5729 | +.1838 | −9.5693 | .9679 |
| 31 | 27 Capricor. | 6 | −31 | −90 | 5 | 18.8 | +8 | 55 | 22 | −1.1115 | .5746 | +.1859 | −9.5570 | .9698 |
| 31 | φ Capricor. | 6 | +5 | −78 | 7 | 49.2 | +11 | 20 | 5 | −0.5209 | .5716 | +.1906 | −9.5592 | .9696 |
| 31 | 33 Capricor. | 6 | +53 | −24 | 11 | 20.5 | −9 | 16 | 36 | +0.3847 | .5651 | +.1999 | −9.5633 | .9688 |
| 31 | 35 Capricor. | 6 | +68 | +13 | 12 | 37.1 | −8 | 2 | 54 | +0.9984 | .5636 | +.2022 | −9.5701 | .9677 |
| 31 | 37 Capricor. | 6 | +64 | −14 | 15 | 48.0 | −4 | 59 | 6 | +0.5583 | .5642 | +.2089 | −9.5488 | .9709 |
| 31 | ε Capricor. | 4½ | +41 | −37 | 16 | 44.2 | −4 | 5 | 1 | +0.1399 | .5655 | +.2111 | −9.5363 | .9727 |
| 31 | κ Capricor. | 5 | +37 | −41 | 19 | 4.3 | −1 | 50 | 12 | +0.0510 | .5642 | +.2160 | −9.5240 | .9743 |
| 31 | B.A.C. 7550 | 6 | +70 | +3 | 19 | 18.0 | −1 | 36 | 55 | +0.8576 | .5613 | +.2160 | −9.5398 | .9722 |
| April 1 | 29 Aquarii | 6 | +43 | −40 | 3 | 27.2 | +6 | 14 | 12 | +0.0821 | .5625 | +.2341 | −9.4810 | .9790 |
| 1 | 50 Aquarii | 6 | −16 | −90 | 13 | 54.2 | −7 | 39 | 28 | −1.0088 | .5594 | +.2508 | −9.3915 | .9864 |
| 1 | B.A.C. 7835 | 6½ | −15 | −90 | 15 | 18.6 | −6 | 20 | 17 | −1.0030 | .5587 | +.2539 | −9.3730 | .9876 |
| 1 | 56 Aquarii | 6 | +75 | −9 | 15 | 24.8 | −6 | 14 | 17 | +0.6765 | .5545 | +.2539 | −9.4220 | .9843 |
| 1 | 70 Aquarii | 6 | −30 | −90 | 23 | 21.3 | +1 | 25 | 10 | −1.2193 | .5559 | +.2657 | −9.2928 | .9915 |
| 2 | 74 Aquarii | 6 | +64 | −23 | 1 | 31.7 | +3 | 26 | 56 | +0.4129 | .5523 | +.2742 | −9.3255 | .9901 |
| 2 | $\psi^1$ Aquarii | 4½ | +75 | −15 | 11 | 27.5 | −10 | 58 | 3 | +0.6586 | .5487 | +.2786 | −9.2340 | .9935 |
| 2 | χ Aquarii | 5½ | +13 | −80 | 11 | 50.6 | −10 | 35 | 56 | −0.5700 | .5507 | +.2791 | −9.1703 | .9952 |
| 2 | $\psi^2$ Aquarii | 4½ | +80 | +9 | 12 | 18.1 | −10 | 9 | 24 | +0.9920 | .5480 | +.2802 | −9.2384 | .9934 |
| 6 | 40 Arietis | 6 | +30 | −51 | 8 | 58.9 | +7 | 20 | 33 | −0.2754 | .5613 | +.2348 | +9.4825 | .9790 |
| 6 | π Arietis | 5½ | +86 | −5 | 19 | 19.0 | +7 | 39 | 55 | +0.6200 | .5638 | +.2347 | +9.4625 | .9809 |
| 6 | $\varrho^2$ Arietis | 6 | +67 | −17 | 12 | 2.7 | +10 | 17 | 26 | +0.3822 | .5644 | +.2289 | +9.4838 | .9789 |
| 6 | $\varrho^3$ Arietis | 6 | +90 | 0 | 12 | 17.3 | +10 | 31 | 40 | +0.6933 | .5652 | +.2289 | +9.4772 | .9795 |
| 6 | 54 Arietis | 6½ | +90 | +23 | 17 | 16.0 | −8 | 40 | 38 | +1.0561 | .5688 | +.2189 | +9.4955 | .9776 |
| 6 | δ Arietis | 4½ | +69 | −14 | 18 | 36.3 | −7 | 23 | 23 | +0.4066 | .5669 | +.2168 | +9.5166 | .9752 |
| 6 | ζ Arietis | 4½ | +10 | −68 | 19 | 56.9 | −6 | 5 | 46 | −0.6350 | .5642 | +.2124 | +9.5445 | .9715 |
| 6 | B.A.C. 1032 | 6½ | +69 | −13 | 22 | 25.3 | −3 | 42 | 58 | +0.4094 | .5686 | +.2081 | +9.5338 | .9730 |
| 6 | $\tau^1$ Arietis | 5 | +33 | −44 | 22 | 33.5 | −3 | 35 | 0 | −0.2037 | .5662 | +.2081 | +9.5469 | .9712 |
| 6 | $\tau^2$ Arietis | 6 | +64 | −17 | 23 | 12.2 | −2 | 57 | 46 | +0.3316 | .5686 | +.2058 | +9.5387 | .9723 |
| 6 | 65 Arietis | 6 | +69 | −13 | 23 | 53.4 | −2 | 18 | 8 | +0.4064 | .5696 | +.2036 | +9.5401 | .9722 |
| 7 | 66 Arietis | 6½ | −46 | −68 | 1 | 30.0 | −0 | 45 | 10 | −1.2909 | .5630 | +.2013 | +9.5793 | .9662 |
| 7 | 9 Tauri | 6 | −16 | −67 | 4 | 59.2 | +2 | 36 | 8 | −1.0318 | .5656 | +.1919 | +9.5871 | .9649 |
| 7 | 1 Pleiadum | 8 | −36 | −67 | 8 | 25.4 | +5 | 54 | 29 | −1.2448 | 0.5656 | +.1848 | +9.6021 | 9.9621 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| April 7 | 3 Pleiadum | 9 | −42 | −67 | 8 29.1 | + 5 58 7 | −1.2823 | 0.5656 | +.1848 | +9.6030 | 9.9620 |
| 7 | 7 Pleiadum | 8 | −33 | −67 | 8 35.7 | + 6 4 26 | −1.2187 | .5656 | +.1848 | +9.6022 | .9621 |
| 7 | B.A.C. 1155 | 7 | +27 | −48 | 8 35.9 | + 6 4 37 | −0.3175 | .5694 | +.1848 | +9.5864 | .9650 |
| 7 | *d* Pleiadum | 5 | −21 | −67 | 8 47.3 | + 6 15 32 | −1.0922 | .5665 | +.1836 | +9.6007 | .9624 |
| 7 | 11 Pleiadum | 8½ | −34 | −67 | 8 55.1 | + 6 23 3 | −1.2260 | .5655 | +.1835 | +9.6034 | .9616 |
| 7 | 13 Pleiadum | 8½ | −20 | −67 | 9 5.3 | + 6 32 55 | −1.0872 | .5662 | +.1834 | +9.6015 | .9622 |
| 7 | 14 Pleiadum | 9 | − 3 | −67 | 9 7.7 | + 6 35 14 | −0.8486 | .5674 | +.1833 | +9.5975 | .9630 |
| 7 | 15 Pleiadum | 8½ | −32 | −66 | 9 10.2 | + 6 37 34 | −1.2073 | .5658 | +.1832 | +9.6038 | .9618 |
| 7 | 16 Pleiadum | 9½ | − 6 | −67 | 9 10.6 | + 6 38 1 | −0.8921 | .5671 | +.1832 | +9.5985 | .9628 |
| 7 | 17 Pleiadum | 8 | 0 | −67 | 9 11.2 | + 6 38 33 | −0.7982 | .5675 | +.1831 | +9.5968 | .9631 |
| 7 | 18 Pleiadum | 8 | −33 | −66 | 9 11.3 | + 6 38 39 | −1.2148 | .5658 | +.1831 | +9.6040 | .9618 |
| 7 | *p* Pleiadum | 7½ | −30 | −66 | 9 12.0 | + 6 39 19 | −1.1899 | .5660 | +.1830 | +9.6036 | .9618 |
| 7 | 19 Pleiadum | 8 | + 6 | −67 | 9 12.4 | + 6 39 42 | −0.7049 | .5681 | +.1829 | +9.5952 | .9634 |
| 7 | 22 Pleiadum | 8 | −12 | −67 | 9 13.6 | + 6 40 54 | −0.9842 | .5669 | +.1829 | +9.6002 | .9625 |
| 7 | 23 Pleiadum | 8½ | + 4 | −66 | 9 14.9 | + 6 42 9 | −0.7393 | .5679 | +.1827 | +9.5960 | .9633 |
| 7 | η Tauri | 3 | −28 | −67 | 9 15.3 | + 6 42 29 | −1.1690 | .5662 | +.1826 | +9.6034 | .9619 |
| 7 | 25 Pleiadum | 8½ | + 8 | −66 | 9 20.0 | + 6 47 1 | −0.6559 | .5685 | +.1825 | +9.5947 | .9635 |
| 7 | 26 Pleiadum | 9 | +13 | −62 | 9 21.4 | + 6 48 25 | −0.5838 | .5687 | +.1823 | +9.5936 | .9637 |
| 7 | 27 Pleiadum | 8½ | −56 | −66 | 9 33.1 | + 6 59 36 | −1.3323 | .5652 | +.1818 | +9.5071 | .9612 |
| 7 | 28 Pleiadum | 7 | +22 | −38 | 9 36.8 | + 7 3 13 | −0.4160 | .5690 | +.1816 | +9.5915 | .9641 |
| 7 | *s* Pleiadum | 7½ | − 1 | −67 | 9 51.2 | + 7 17 3 | −0.8150 | .5679 | +.1810 | +9.5992 | .9627 |
| 7 | *f* Pleiadum | 4½ | −13 | −67 | 9 56.3 | + 7 21 56 | −0.9975 | .5670 | +.1809 | +9.6026 | .9620 |
| 7 | *h* Pleiadum | 5½ | −20 | −66 | 9 56.7 | + 7 22 24 | −1.0802 | .5666 | +.1808 | +9.6041 | .9617 |
| 7 | 30 Pleiadum | 8½ | −13 | −67 | 9 57.5 | + 7 23 6 | −0.9943 | .5679 | +.1808 | +9.5997 | .9626 |
| 7 | 32 Pleiadum | 8 | −26 | −66 | 10 0.7 | + 7 26 12 | −1.1474 | .5658 | +.1807 | +9.6083 | .9610 |
| 7 | 33 Pleiadum | 8½ | −29 | −66 | 10 2.6 | + 7 28 1 | −1.1754 | .5664 | +.1806 | +9.6060 | .9614 |
| 7 | 34 Pleiadum | 7½ | +11 | −52 | 10 10.4 | + 7 35 33 | −0.6123 | .5690 | +.1803 | +9.5967 | .9632 |
| 7 | 35 Pleiadum | 9 | −26 | −66 | 10 10.8 | + 7 35 54 | −1.1482 | .5692 | +.1803 | +9.6060 | .9614 |
| 7 | 36 Pleiadum | 9 | −22 | −66 | 10 14.4 | + 7 39 22 | −1.1107 | .5668 | +.1801 | +9.6055 | .9615 |
| 7 | 37 Pleiadum | 8 | −36 | −66 | 10 14.9 | + 7 39 53 | −1.2425 | .5661 | +.1801 | +9.6078 | .9610 |
| 7 | 38 Pleiadum | 8 | + 4 | −63 | 10 16.2 | + 7 41 5 | −0.7338 | .5683 | +.1801 | +9.5991 | .9627 |
| 7 | B.A.C. 1189 | 7 | +90 | +32 | 10 17.1 | + 7 41 59 | +0.8890 | .5752 | +.1800 | +9.5699 | .9678 |
| 7 | 40 Pleiadum | 7½ | + 1 | −67 | 10 38.2 | + 8 2 13 | −0.7845 | .5681 | +.1792 | +9.6011 | .9623 |
| 7 | 32 Tauri | 6 | +90 | +34 | 13 6.2 | +10 24 38 | +1.1275 | .5774 | +.1723 | +9.5447 | .9670 |
| 7 | 33 Tauri | 6 | +72 | − 8 | 18 9.9 | +10 28 12 | +0.4369 | .5744 | +.1723 | +9.5875 | .9648 |
| 7 | 36 Tauri | 6½ | +43 | −31 | 16 5.7 | −10 42 50 | −0.0312 | .5731 | +.1645 | +9.6043 | .9617 |
| 7 | χ Tauri | 5½ | +17 | −54 | 23 23.0 | − 3 42 19 | −0.5034 | .5728 | +.1458 | +9.6306 | .9563 |
| 8 | B.A.C. 1648 | 6½ | +18 | −49 | 22 35.0 | − 5 24 38 | −0.4814 | .5752 | +.0971 | +9.6689 | .9467 |
| 9 | β Tauri | 2 | −18 | −62 | 0 40.2 | − 3 24 22 | −1.0177 | .5721 | +.0739 | +9.6784 | .9440 |
| 9 | B.A.C. 1746 | 6½ | +56 | −10 | 4 31.9 | + 0 18 14 | +0.1916 | .5782 | +.0620 | +9.6654 | .9477 |
| 9 | 136 Tauri | 5 | +82 | +10 | 11 28.2 | + 6 58 18 | +0.5389 | .5788 | +.0410 | +9.6655 | .9476 |
| 9 | B.A.C. 1882 | 6½ | − 3 | −61 | 12 43.5 | + 8 10 38 | −0.8130 | .5717 | +.0381 | +9.6844 | .9422 |
| 10 | B.A.C. 2097 | 6½ | +48 | −11 | 2 22.0 | − 2 42 29 | +0.0544 | .5712 | −.0334 | +9.6760 | .9447 |
| 10 | 49 Aurigæ | 5½ | +58 | − 3 | 4 20.4 | − 0 48 37 | +0.2253 | .5719 | −.0091 | +9.6735 | .9454 |
| 10 | 53 Aurigæ | 6½ | − 4 | −61 | 5 36.7 | + 0 24 45 | −0.8173 | .5661 | −.0121 | +9.6870 | .9414 |
| 10 | 54 Aurigæ | 6 | +40 | −19 | 6 6.6 | + 0 53 32 | −0.0665 | .5692 | −.0152 | +9.6771 | .9444 |
| 10 | 28 Geminor. | 6 | + 6 | −61 | 8 13.3 | + 2 55 27 | −0.8718 | .5640 | −.0206 | +9.6872 | .9413 |
| 10 | 47 Geminor. | 6 | +90 | +28 | 19 19.4 | −10 23 30 | +0.8782 | .5669 | −.0513 | +9.6584 | .9495 |
| 10 | 53 Geminor. | 6 | +26 | −37 | 21 12.7 | − 8 34 20 | −0.3471 | .5544 | −.0568 | +9.6875 | .9412 |
| 11 | 59 Geminor. | 6½ | +26 | −43 | 0 51.3 | − 5 3 45 | −0.3228 | .5586 | −.0647 | +9.6704 | .9463 |
| 11 | ι Geminor. | 4 | +14 | −50 | 1 21.6 | − 4 34 37 | −0.5370 | .5564 | −.0674 | +9.6728 | .9456 |
| 11 | $b^1$ Geminor. | 5½ | −16 | −62 | 2 52.9 | − 3 6 38 | −0.9972 | .5526 | −.0726 | +9.6773 | .9443 |
| 11 | $b^2$ Geminor. | 5½ | − 2 | −62 | 3 4.6 | − 2 55 21 | −0.7954 | .5536 | −.0726 | +9.6746 | .9451 |
| 11 | B.A.C. 2472 | 6 | − 4 | −62 | 3 27.3 | − 2 33 28 | −0.8247 | .5537 | −.0726 | +9.6746 | .9451 |
| 11 | υ Geminor. | 5 | +49 | −17 | 5 44.2 | − 0 21 43 | +0.0730 | 0.5568 | −.0777 | +9.6603 | 9.9490 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log. cos $D$ |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| April 11 | c Geminor. | 6 | +90 | +29 | 9 18.2 | + 3 4 44 | +0.9454 | 0.5578 | —.0878 | +9.6438 | 9.9532 |
| 11 | φ Geminor. | 5 | +15 | —52 | 13 22.0 | + 6 59 54 | —0.5181 | .5485 | —.0977 | +9.6591 | .9494 |
| 11 | ω¹ Cancri | 6 | +88 | + 7 | 16 40.4 | +10 11 20 | +0.6023 | .5526 | —.1048 | +9.6385 | .9545 |
| 11 | ω² Cancri | 6½ | +90 | +23 | 17 2.3 | +10 32 27 | +0.8900 | .5513 | —.1071 | +9.6337 | .9555 |
| 11 | ψ¹ Cancri | 6½ | +44 | —25 | 20 47.7 | — 9 50 1 | —0.0112 | .5459 | —.1141 | +9.6408 | .9539 |
| 11 | ψ² Cancri | 4 | +42 | —27 | 20 54.9 | — 9 43 6 | —0.0354 | .5441 | —.1163 | +9.6410 | .9538 |
| 12 | λ Cancri | 6 | +90 | +28 | 1 29.4 | — 5 18 0 | +1.0106 | .5459 | —.1253 | +9.6173 | .9591 |
| 12 | υ¹ Cancri | 7 | +49 | —23 | 4 16.1 | — 2 36 56 | +0.0731 | .5396 | —.1317 | +9.6260 | .9573 |
| 12 | υ² Cancri | 6½ | +67 | — 8 | 5 10.3 | — 1 44 39 | +0.3719 | .5400 | —.1318 | +9.6197 | .9586 |
| 12 | B.A.C. 2840 | 7 | +49 | —22 | 5 39.1 | — 1 16 48 | +0.0882 | .5393 | —.1318 | +9.6230 | .9579 |
| 12 | υ³ Cancri | 6 | +60 | —14 | 6 30.4 | — 0 27 11 | +0.2517 | .5389 | —.1360 | +9.6188 | .9588 |
| 12 | 32 Cancri | 7 | +53 | —20 | 7 11.6 | + 0 12 36 | +0.1487 | .5375 | —.1380 | +9.6189 | .9588 |
| 13 | ξ Cancri | 5 | +23 | —52 | 0 25.8 | — 7 6 57 | —0.3945 | .5225 | —.1704 | +9.5852 | .9652 |
| 13 | 79 Cancri | 6 | +21 | —54 | 0 54.6 | — 6 39 5 | —0.4255 | .5217 | —.1722 | +9.5843 | .9654 |
| 13 | B.A.C. 3138 | 6 | +59 | —20 | 2 31.3 | — 5 5 28 | +0.2403 | .5230 | —.1739 | +9.5713 | .9675 |
| 13 | B A.C. 3292 | 6½ | —33 | —69 | 15 6.5 | + 7 6 26 | —1.2374 | .5093 | —.1945 | +9.5532 | .9703 |
| 14 | η Leonis | 3½ | +23 | —59 | 5 49.4 | — 2 36 58 | —0.4068 | .5035 | —.2132 | +9.4772 | .9795 |
| 14 | 42 Leonis | 6 | +37 | —46 | 13 32.5 | + 4 52 51 | —0.1444 | .4996 | —.2224 | +9.4323 | .9835 |
| 14 | B.A.C. 3579 | 6 | +35 | —48 | 16 45.7 | + 7 59 34 | —0.1762 | .4981 | —.2255 | +9.4151 | .9848 |
| 14 | i Leonis | 6 | +19 | —66 | 19 7.7 | +10 18 34 | —0.4885 | .4954 | —.2285 | +9.4094 | .9852 |
| 15 | l Leonis | 5 | +90 | +37 | 4 29.0 | — 4 35 47 | +1.2888 | .4950 | —.2369 | +9.2923 | .9915 |
| 15 | B.A.C. 3837 | 6½ | +89 | — 8 | 18 18.5 | + 8 51 4 | +0.6701 | .4882 | —.2469 | +9.1869 | .9948 |
| 16 | B.A.C. 3996 | 6 | —23 | —84 | 14 16.0 | + 4 16 41 | —1.1956 | .4826 | —.2567 | +9.0186 | .9976 |
| 16 | b Virginis | 6 | —15 | —86 | 20 28.8 | +10 19 37 | —1.0887 | .4824 | —.2585 | +8.8905 | .9987 |
| 17 | 10 Virginis | 6 | +14 | —81 | 2 4.9 | — 8 13 1 | —0.5961 | .4780 | —.2598 | +8.6737 | 9.9995 |
| 17 | 13 Virginis | 6 | +90 | +12 | 7 13.6 | — 3 12 31 | +1.0563 | .4785 | —.2606 | +6.2654 | 0.0000 |
| 17 | η Virginis | 3½ | +90 | — 7 | 7 57.0 | — 2 30 16 | +0.7338 | .4851 | —.2605 | +7.3586 | 0.0000 |
| 17 | MARS | | + 2 | —90 | 17 55.4 | + 7 12 25 | —0.8061 | .5001 | —.2659 | —8.1605 | 0.0000 |
| 18 | 38 Virginis | 6 | —10 | —90 | 3 0.2 | — 7 57 10 | —1.0095 | .4861 | —.2596 | —8.6846 | 9.9995 |
| 18 | θ Virginis | 4½ | —27 | —90 | 12 27.4 | + 1 14 55 | —1.2371 | .4842 | —.2571 | —8.9201 | .9985 |
| 19 | h Virginis | 6 | +80 | —11 | 1 14.5 | —10 18 47 | +0.6506 | .4917 | —.2508 | —9.2142 | .9941 |
| 19 | 86 Virginis | 6 | +78 | +48 | 8 20.3 | — 3 24 42 | +1.3954 | .4935 | —.2473 | —9.3073 | .9909 |
| 20 | B.A.C. 4896 | 6 | + 8 | —81 | 18 41.0 | + 5 56 27 | —0.5653 | .5166 | —.2140 | —9.4507 | .9801 |
| 21 | ι¹ Libræ | 4½ | +13 | —71 | 4 52.6 | — 8 10 47 | —0.4290 | .5249 | —.1986 | —9.5180 | .9750 |
| 22 | B.A.C. 5251 | 6 | +64 | —10 | 0 35.4 | +10 58 49 | +0.6340 | .5349 | —.1658 | —9.6015 | .9622 |
| 22 | δ Scorpii | 2½ | —53 | —90 | 3 34.1 | —10 13 25 | —1.2957 | .5445 | —.1600 | —9.5775 | .9665 |
| 22 | 19 Scorpii | 5½ | —22 | —90 | 12 42.7 | — 1 23 28 | —0.9270 | .5498 | —.1411 | —9.6063 | .9613 |
| 22 | σ Scorpii | 3½ | +59 | —12 | 12 55.2 | — 1 11 26 | +0.5808 | .5451 | —.1390 | —9.6299 | .9564 |
| 22 | α Scorpii | 1½ | +64 | +16 | 16 32.6 | + 2 18 40 | +1.0186 | .5445 | —.1322 | —9.6436 | .9532 |
| 22 | 22 Scorpii | 5 | + 4 | —73 | 16 56.2 | + 2 41 16 | —0.4468 | .5521 | —.1300 | —9.6227 | .9580 |
| 23 | 25 Scorpii | 6 | —19 | —90 | 0 12.7 | + 9 42 22 | —0.8322 | .5583 | —.1136 | — 9.6303 | .9563 |
| 23 | A Ophiuchi | 5 | —22 | —90 | 12 24.3 | — 2 32 32 | —0.8307 | .5660 | —.0833 | — 9.6478 | .9522 |
| 23 | 43 Ophiuchi | 6 | +57 | — 9 | 15 41.5 | + 0 37 28 | +0.6302 | .5604 | —.0754 | — 9.6716 | .9459 |
| 24 | 3 Sagittarii | 5 | + 8 | —58 | 1 45.5 | +10 18 53 | —0.2219 | .5695 | —.0656 | — 9.6684 | .9469 |
| 24 | B.A.C. 6063 | 6½ | +12 | —50 | 5 30.7 | —10 4 23 | —0.0953 | .5704 | —.0366 | — 9.6722 | .9458 |
| 24 | B.A.C. 6072 | 6½ | +53 | — 9 | 6 17.2 | — 9 19 42 | +0.6149 | .5673 | —.0338 | —9.6819 | .9429 |
| 24 | B.A.C. 6120 | 6½ | +30 | —29 | 9 37.3 | — 6 7 14 | +0.2622 | .5703 | —.0252 | —9.6783 | .9440 |
| 24 | B.A.C. 6127 | 5 | +28 | —32 | 10 8.9 | — 5 36 44 | +0.2219 | .5707 | —.0223 | —9.6782 | .9440 |
| 24 | B.A.C. 6190 | 6½ | +37 | —22 | 13 56.0 | — 1 58 24 | +0.3950 | .5711 | —.0107 | —9.6814 | .9431 |
| 24 | B.A.C. 6191 | 6½ | +15 | —44 | 13 56.2 | — 1 58 10 | +0.0072 | .5731 | —.0107 | —9.6763 | .9446 |
| 24 | B.A.C. 6220 | 6½ | +23 | —35 | 15 48.6 | — 0 10 6 | +0.1652 | .5723 | —.0078 | —9.6786 | .9439 |
| 25 | φ Sagittarii | 3½ | —53 | —90 | 1 24.6 | + 9 3 44 | —1.1915 | .5810 | +.0217 | —9.6590 | .9494 |
| 25 | τ Sagittarii | 3½ | +12 | —51 | 9 58.3 | — 6 42 25 | —0.1157 | .5761 | +.0483 | —9.6698 | .9464 |
| 25 | B.A.C. 6628 | 6 | +52 | —12 | 17 2.5 | + 0 5 20 | +0.5653 | .5720 | +.0688 | —9.6736 | .9454 |
| 25 | B.A.C. 6666 | 6 | —15 | —90 | 19 13.6 | + 2 10 22 | —0.7009 | 0.5757 | +.0747 | —9.6611 | 9.9488 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| April 26 | ω Sagittarii | 5½ | +30 | −37 | 5 45.1 | −11 41 26 | +0.1358 | 0.5721 | +.1032 | −9.6522 | 9.9511 |
| 26 | *b* Sagittarii | 5 | +63 | +23 | 6 11.5 | −11 16 4 | +1.0864 | .5671 | +.1060 | −9.6651 | .9477 |
| 26 | A Sagittarii | 5 | +33 | −35 | 7 1.8 | −10 27 40 | +0.1733 | .5717 | +.1088 | −9.6508 | .9515 |
| 26 | B.A.C. 7077 | 6 | +63 | − 2 | 20 58.5 | + 2 57 12 | +0.7469 | .5640 | +.1464 | −9.6328 | .9557 |
| 27 | B.A.C. 7197 | 6 | + 4 | −76 | 3 26.9 | + 9 10 59 | −0.4900 | .5673 | +.1614 | −9.5965 | .9632 |
| 27 | B.A.C. 7237 | 6 | +66 | + 8 | 5 22.6 | +11 2 25 | +0.9154 | .5608 | +.1664 | −9.6147 | .9597 |
| 27 | B.A.C. 7335 | 6 | + 3 | −81 | 11 58.9 | − 6 35 56 | −0.5484 | .5631 | +.1828 | −9.5693 | .9679 |
| 27 | 27 Capricor. | 6 | −32 | −90 | 12 24.4 | − 6 11 25 | −1.1231 | .5655 | +.1828 | −9.5569 | .9698 |
| 27 | φ Capricor. | 6 | + 5 | −78 | 14 59.5 | − 3 42 0 | −0.5249 | .5618 | +.1897 | −9.5591 | .9694 |
| 27 | 33 Capricor. | 6 | +54 | −23 | 18 37.5 | − 0 11 59 | +0.3950 | .5572 | +.1962 | −9.5613 | .9688 |
| 27 | 35 Capricor. | 6 | +68 | +14 | 19 56.6 | + 1 4 18 | +1.0184 | .5537 | +.2005 | −9.5701 | .9677 |
| 27 | 37 Capricor. | 6 | +64 | −14 | 23 13.9 | + 4 14 29 | +0.5723 | .5541 | +.2066 | −9.5488 | .9710 |
| 28 | ι Capricor. | 4½ | +42 | −36 | 0 12.0 | + 5 10 25 | +0.1472 | .5551 | +.2086 | −9.5363 | .9727 |
| 28 | κ Capricor. | 5 | +37 | −41 | 2 36.7 | + 7 29 56 | +0.0574 | .5546 | +.2126 | −9.5240 | .9743 |
| 28 | B.A.C. 1750 | 6 | +70 | + 4 | 2 50.9 | + 7 43 39 | +0.8768 | .5519 | +.2126 | −9.5398 | .9722 |
| 28 | 29 Capricor. | 6 | +41 | −40 | 11 16.9 | − 8 8 24 | +0.0863 | .5505 | +.2295 | −9.4818 | .9791 |
| 28 | 50 Aquarii | 6 | −16 | −90 | 21 3.9 | + 1 18 1 | −1.0177 | .5493 | +.2460 | −9.3914 | .9864 |
| 28 | B.A.C. 7835 | 6½ | −15 | −90 | 23 33.4 | + 3 42 18 | −1.0123 | .5487 | +.2489 | −9.3729 | .9876 |
| 28 | 56 Aquarii | 6 | +75 | − 7 | 23 44.1 | + 3 52 51 | +0.7139 | .5444 | +.2490 | −9.4220 | .9843 |
| 29 | 70 Aquarii | 6 | −30 | −90 | 7 54.5 | +11 46 14 | −1.2291 | .5453 | +.2612 | −9.2927 | .9915 |
| 29 | 74 Aquarii | 6 | +64 | −22 | 10 8.1 | −10 4 48 | +0.4297 | .5441 | +.2650 | −9.3312 | .9898 |
| 29 | $\psi^1$ Aquarii | 4½ | +80 | −10 | 20 20.0 | − 0 13 41 | +0.6591 | .5389 | +.2743 | −9.2341 | .9935 |
| 29 | χ Aquarii | 5½ | +13 | −79 | 20 49.3 | + 0 14 39 | −0.5666 | .5410 | +.2743 | −9.1702 | .9952 |
| 29 | $\psi^2$ Aquarii | 4½ | +80 | +10 | 21 16.8 | + 0 41 14 | +1.0151 | .5381 | +.2751 | −9.2383 | .9934 |
| 30 | 24 Piscium | 6½ | +21 | −70 | 13 24.2 | − 7 43 52 | −0.4415 | .5381 | +.2863 | −8.8386 | .9990 |
| 30 | 27 Piscium | 5 | +85 | − 7 | 16 3.0 | − 5 10 14 | +0.7178 | .5370 | +.2877 | −8.8804 | .9987 |
| 30 | 29 Piscium | 5½ | +82 | −13 | 17 30.0 | − 3 46 15 | +0.6138 | .5374 | +.2880 | −8.8248 | .9990 |
| 30 | JUPITER | | −39 | −90 | 18 19.0 | − 2 58 47 | −1.3643 | .5305 | +.2852 | −8.4463 | .9998 |
| May 1 | 44 Piscium | 6 | −15 | −89 | 4 22.1 | + 6 44 0 | −1.0907 | .5384 | +.2904 | +8.2994 | 9.9999 |
| 1 | 10 Ceti | 6 | + 7 | −87 | 4 55.1 | + 7 15 58 | −0.7205 | .5386 | +.2905 | +8.1698 | 0.0000 |
| 1 | B.A.C. 274 | 6½ | −18 | −84 | 20 6.0 | − 2 3 52 | −1.1298 | .5406 | +.2877 | +8.9974 | 9.9978 |
| 1 | 73 Piscium | 6½ | +64 | −26 | 22 23.6 | + 0 9 5 | +0.3430 | .5425 | +.2869 | +8.9300 | .9984 |
| 1 | 77 Piscium *pr.* | 7 | +90 | +31 | 22 40.1 | + 0 25 0 | +1.1561 | .5431 | +.2869 | +8.8585 | .9989 |
| 1 | *e* Piscium | 5½ | +90 | + 2 | 23 59.3 | + 1 41 33 | +0.7966 | .5436 | +.2861 | +8.9304 | .9984 |
| 2 | ζ Piscium | 6 | +22 | −68 | 2 22.1 | + 3 59 29 | −0.4297 | .5430 | +.2849 | +9.0742 | .9969 |
| 2 | 88 Piscium | 6½ | +59 | −29 | 2 49.5 | + 4 25 54 | +0.2735 | .5436 | +.2849 | +9.0357 | .9974 |
| 6 | B.A.C. 1648 | 6½ | +16 | −49 | 8 24.5 | + 6 12 54 | −0.5063 | .5830 | +.0800 | +9.6689 | .9467 |
| 6 | β Tauri | 2 | −20 | −62 | 10 26.8 | + 8 10 20 | −1.0428 | .5804 | +.0739 | +9.6784 | .9440 |
| 6 | B.A.C. 1746 | 6½ | +55 | −12 | 14 12.8 | +11 47 14 | +0.1543 | .5863 | +.0615 | +9.6654 | .9477 |
| 6 | 136 Tauri | 5 | +78 | + 8 | 20 59.5 | − 5 42 20 | +0.4960 | .5871 | +.0397 | +9.6655 | .9476 |
| 6 | B.A.C. 1882 | 6½ | − 5 | −61 | 22 12.6 | − 4 32 11 | −0.8435 | .5798 | +.0367 | +9.6844 | .9422 |
| 7 | B.A.C. 2097 | 6½ | +45 | −14 | 11 30.9 | + 8 14 25 | +0.0107 | .5801 | −.0033 | +9.6760 | .9447 |
| 7 | 49 Aurigæ | 5½ | +55 | − 6 | 13 26.5 | +10 5 29 | +0.1788 | .5802 | −.0093 | +9.6735 | .9454 |
| 7 | 53 Aurigæ | 6½ | − 6 | −61 | 14 40.9 | +11 16 55 | −0.8525 | .5742 | −.0123 | +9.6870 | .9414 |
| 7 | 54 Aurigæ | 6 | +38 | −21 | 15 10.0 | +11 44 55 | −0.1104 | .5777 | −.0153 | +9.6771 | .9444 |
| 7 | 28 Geminor. | 6 | −10 | −61 | 17 13.5 | −10 16 23 | −0.9078 | .5724 | −.0212 | +9.6872 | .9413 |
| 8 | 47 Geminor. | 6 | +90 | +24 | 4 3.2 | + 0 8 15 | +0.8200 | .5745 | −.0532 | +9.6584 | .9495 |
| 8 | 53 Geminor. | 6 | +21 | −42 | 5 53.8 | + 1 54 36 | −0.4100 | .5669 | −.0587 | +9.6737 | .9453 |
| 8 | 59 Geminor. | 6½ | +23 | −40 | 9 27.1 | + 5 19 51 | −0.3709 | .5655 | −.0670 | +9.6704 | .9463 |
| 8 | ι Geminor. | 4 | +11 | −54 | 9 56.5 | + 5 48 14 | −0.5824 | .5634 | −.0697 | + 9.6728 | .9456 |
| 8 | $b^1$ Geminor. | 5½ | −16 | −62 | 11 25.7 | + 7 14 3 | −1.0387 | .5607 | −.0724 | +9.6775 | .9442 |
| 8 | $b^2$ Geminor. | 5½ | −25 | −62 | 14 58.3 | +10 38 43 | −1.1008 | .5586 | −.0830 | +9.6746 | .9451 |
| 8 | B.A.C. 2472 | 6 | − 7 | −69 | 11 59.1 | + 7 46 15 | −0.8674 | .5607 | −.0751 | +9.6746 | .9451 |
| 8 | υ Geminor. | 5 | +45 | −20 | 14 12.9 | + 9 55 1 | +0.0193 | .5634 | −.0804 | +9.6603 | .9490 |
| 8 | *c* Geminor. | 6 | +90 | +25 | 17 41.9 | −10 43 35 | +0.8812 | 0.5656 | −.0882 | +9.6438 | 9.9532 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log. cos $D$ |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| May 8 | $\varphi$ Geminor. | 5 | +12 | —55 | 21 40.1 | — 6 54 20 | —0.5679 | 0.5556 | —.0984 | +9.6591 | 9.9494 |
| 9 | $\omega^1$ Cancri | 6 | +81 | + 3 | 0 53.9 | — 3 47 21 | +0.5400 | .5568 | —.1081 | +9.6385 | .9545 |
| 9 | $\omega^2$ Cancri | 6½ | +90 | +19 | 1 15.5 | — 3 26 33 | +0.8239 | .5582 | —.1081 | +9.6337 | .9555 |
| 9 | $\psi^1$ Cancri | 6½ | +90 | + 8 | 4 55.6 | + 0 5 39 | +0.6454 | .5537 | —.1177 | +9.6303 | .9563 |
| 9 | $\psi^2$ Cancri | 4 | +39 | —30 | 5 3.0 | + 0 12 47 | —0.0899 | .5507 | —.1177 | +9.6410 | .9538 |
| 9 | $\lambda$ Cancri | 6 | +90 | +24 | 9 30.9 | + 4 31 15 | +0.9376 | .5521 | —.1269 | +9.6173 | .9591 |
| 9 | $\upsilon^1$ Cancri | 7 | +45 | —26 | 12 14.2 | + 7 8 55 | +0.0144 | .5454 | —.1335 | +9.6260 | .9573 |
| 9 | $\upsilon^2$ Cancri | 6½ | +63 | —11 | 13 7.2 | + 8 0 5 | +0.3090 | .5455 | —.1356 | +9.6197 | .9586 |
| 9 | B.A.C. 2840 | 7 | +46 | —26 | 13 35.5 | + 8 27 22 | +0.0293 | .5447 | —.1356 | +9.6230 | .9579 |
| 9 | $\upsilon^3$ Cancri | 6 | +56 | —18 | 14 25.8 | + 9 15 58 | +0.1904 | .5444 | —.1378 | +9.6191 | .9587 |
| 9 | 32 Cancri | 7 | +50 | —23 | 15 2.5 | + 9 47 16 | +0.0967 | .5430 | —.1398 | +9.6189 | .9588 |
| 10 | $\xi$ Cancri | 5 | +20 | —56 | 8 2.8 | + 2 17 47 | —0.4565 | .5262 | —.1727 | +9.5862 | .9652 |
| 10 | 79 Cancri | 6 | +18 | —57 | 8 31.3 | + 2 45 20 | —0.4875 | .5265 | —.1727 | +9.5843 | .9654 |
| 10 | B.A.C. 3138 | 6 | +44 | —31 | 10 6.5 | + 4 18 27 | —0.0003 | .5260 | —.1761 | +9.5713 | .9675 |
| 10 | B.A.C. 3292 | 6½ | —40 | —69 | 22 31.2 | — 7 41 11 | —1.2963 | .5129 | —.1963 | +9.5532 | .9703 |
| 11 | $\eta$ Leonis | 3½ | +19 | —63 | 13 4.6 | + 6 25 54 | —0.4744 | .5044 | —.2146 | +9.4772 | .9795 |
| 11 | 42 Leonis | 6 | +33 | —49 | 20 44.0 | —10 8 4 | —0.2135 | .5011 | —.2227 | +9.4323 | .9832 |
| 12 | B.A.C. 3579 | 6 | +25 | —59 | 0 27.9 | — 6 30 35 | —0.3677 | .4982 | —.2268 | +9.4151 | .9848 |
| 12 | *i* Leonis | 6 | +15 | —70 | 1 16.9 | — 5 44 38 | —0.5565 | .4966 | —.2288 | +9.4094 | .9852 |
| 12 | *l* Leonis | 5 | +90 | +29 | 11 35.3 | + 4 18 3 | +1.2128 | .4983 | —.2369 | +9.2923 | .9915 |
| 13 | B.A.C. 3837 | 6½ | +82 | —12 | 1 21.4 | — 6 18 26 | +0.6019 | .4881 | —.2465 | +9.1870 | .9948 |
| 13 | B.A.C. 3996 | 6 | —28 | —84 | 21 18.0 | —10 53 41 | —1.2560 | .4817 | —.2559 | +9.0187 | .9976 |
| 14 | *b* Virginis | 6 | —29 | —86 | 3 30.8 | — 4 50 46 | —1.1468 | .4814 | —.2575 | +8.8903 | .9987 |
| 14 | 10 Virginis | 6 | +11 | —85 | 9 6.3 | + 0 35 57 | —0.6495 | .4815 | —.2587 | +8.6738 | 9.9995 |
| 14 | 13 Virginis | 6 | +90 | + 9 | 14 16.1 | + 5 37 38 | +0.9970 | .4819 | —.2594 | +6.2654 | 0.0000 |
| 14 | $\eta$ Virginis | 3½ | +89 | —10 | 14 59.2 | + 6 18 35 | +0.6778 | .4821 | —.2595 | +7.3591 | 0.0000 |
| 14 | MARS | | +90 | +14 | 15 10.0 | + 6 29 58 | +1.0661 | .4836 | —.2603 | —7.6563 | 0.0000 |
| 15 | 38 Virginis | 6 | —13 | —90 | 10 2.6 | + 0 52 49 | —1.0515 | .4852 | —.2584 | —8.6846 | 9.9995 |
| 15 | $\theta$ Virginis | 4½ | —31 | —90 | 19 29.7 | +10 4 45 | —1.2717 | .4876 | —.2559 | —8.9201 | .9985 |
| 16 | *k* Virginis | 6 | +78 | —13 | 8 16.1 | — 1 29 37 | +0.6180 | .4918 | —.2507 | —9.2142 | .9941 |
| 16 | 86 Virginis | 6 | +79 | +43 | 15 20.2 | + 5 21 50 | +1.3687 | .4940 | —.2466 | —9.3073 | .9909 |
| 18 | B.A.C. 4896 | 6 | + 6 | —84 | 1 29.6 | — 9 27 24 | —0.5572 | .5195 | —.2139 | —9.4707 | .9802 |
| 18 | $\iota^1$ Libræ | 4½ | +14 | —69 | 11 35.8 | + 0 19 57 | —0.4114 | .5269 | —.1999 | —9.5180 | .9750 |
| 19 | B.A.C 5253 | 6 | +66 | +40 | 7 4.1 | — 4 49 54 | +1.2633 | .5375 | —.1651 | —9.6111 | .9604 |
| 19 | B.A.C. 5254 | 6 | +65 | — 8 | 7 5.9 | — 4 48 7 | +0.6645 | .5396 | —.1651 | —9.6016 | .9622 |
| 19 | $\delta$ Scorpii | 2½ | —47 | —90 | 10 2.5 | — 1 57 33 | —1.2531 | .5514 | —.1592 | —9.5775 | .9665 |
| 19 | 19 Scorpii | 5½ | —19 | —90 | 19 4.3 | + 6 45 34 | —0.8782 | .5551 | —.1399 | —9.6063 | .9613 |
| 19 | $\sigma$ Scorpii | 3½ | +61 | —10 | 19 16.6 | + 6 57 29 | +0.6227 | .5489 | —.1399 | —9.6299 | .9564 |
| 19 | $\alpha$ Scorpii | 1½ | +64 | +20 | 22 51.5 | +10 24 49 | +1.0615 | .5487 | —.1331 | —9.6436 | .9532 |
| 19 | 22 Scorpii | 5 | + 6 | —69 | 23 14.6 | +10 47 5 | —0 3960 | .5563 | —.1308 | —9.6227 | .9580 |
| 20 | 25 Scorpii | 6 | —16 | —90 | 6 25.4 | — 6 17 31 | —0.7736 | .5629 | —.1141 | —9.6303 | .9563 |
| 20 | A Ophiuchi | 5 | —18 | —90 | 18 27.3 | + 5 17 55 | —0.7619 | .5707 | —.0832 | —9.6478 | .9522 |
| 20 | 43 Ophiuchi | 6 | +53 | —12 | 21 41.9 | + 8 25 19 | +0.5750 | .5627 | —.0748 | —9.6716 | .9459 |
| 21 | 3 Sagittarii | 5 | +11 | —53 | 7 38.3 | — 6 0 51 | —0.1466 | .5742 | —.0472 | —9.6684 | .9469 |
| 21 | B.A.C. 6024 | 6½ | —37 | —90 | 8 47.9 | — 4 53 56 | —1.0032 | .5786 | —.0443 | —9.6672 | .9498 |
| 21 | B.A.C. 6063 | 6½ | +16 | —45 | 11 20.8 | — 2 26 54 | —0.0156 | .5753 | —.0356 | —9.6752 | .9458 |
| 21 | B.A.C. 6072 | 6½ | +59 | — 4 | 12 6.8 | — 1 42 42 | +0.6923 | .5720 | —.0327 | —9.6819 | .9429 |
| 21 | B.A.C. 6120 | 6½ | +33 | —26 | 15 24.5 | + 1 27 27 | +0.3177 | .5748 | —.0243 | —9.6783 | .9440 |
| 21 | B.A.C. 6127 | 5 | +32 | —27 | 15 56.0 | + 1 56 42 | +0.3038 | .5753 | —.0210 | —9.6782 | .9440 |
| 21 | B.A.C. 6190 | 6½ | +42 | —17 | 19 40.4 | + 5 33 25 | +0.4797 | .5750 | —.0121 | —9.6814 | .9431 |
| 21 | B.A.C. 6191 | 6½ | +20 | —39 | 19 40.6 | + 5 33 39 | +0.0932 | .5770 | —.0121 | —9.6763 | .9446 |
| 21 | B.A.C. 6194 | 5½ | —56 | —90 | 19 59.2 | + 5 51 30 | —1.2134 | .5840 | —.0092 | —9.6584 | .9495 |
| 21 | B.A.C. 6220 | 6½ | +28 | —30 | 21 31.8 | + 7 20 31 | +0.2523 | .5765 | —.0062 | —9.6786 | .9439 |
| 22 | $\varphi$ Sagittarii | 3½ | —45 | —90 | 7 2.3 | — 7 31 13 | —1.0942 | .5847 | +.0238 | —9.6590 | .9494 |
| 22 | $\tau$ Sagittarii | 3½ | +18 | —45 | 15 31.9 | + 0 38 34 | —0.0147 | 0.5789 | +.0476 | —9.6698 | 9.9464 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log. cos $D$ |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| May 22 | B.A.C. 6628 | 6 | +59 | — 6 | 22 33.4 | + 7 23 36 | +0.6700 | 0.5748 | +.0684 | —9.6736 | 9 9454 |
| 23 | B.A.C. 6666 | 6 | +17 | —48 | 0 43.9 | + 9 28 58 | —0.0718 | .5778 | +.0741 | —9.6611 | .9488 |
| 23 | ω Sagittarii | 5½ | +37 | —30 | 11 13.4 | — 4 25 49 | +0.2523 | .5729 | +.1056 | —9.6522 | .9511 |
| 23 | *b* Sagittarii | 5 | +63 | +36 | 11 39.9 | — 4 0 19 | +1.2017 | .5683 | +.1055 | —9.6651 | .9477 |
| 23 | A Sagittarii | 5 | +39 | —28 | 12 30.2 | — 3 11 58 | +0.2891 | .5725 | +.1083 | —9.6508 | .9515 |
| 24 | B.A.C. 7077 | 6 | +65 | + 6 | 2 27.7 | +10 13 45 | +0.8730 | .5639 | +.1455 | —9.6328 | .9557 |
| 24 | B.A.C. 7197 | 6 | +11 | —67 | 8 58.6 | — 7 29 59 | —0.3621 | .5651 | +.1629 | —9.5965 | .9632 |
| 24 | B.A.C. 7237 | 6 | +66 | +18 | 10 54.6 | — 5 38 14 | +1.0474 | .5586 | +.1676 | —9.6147 | .9597 |
| 24 | B.A.C. 7335 | 6 | +10 | —70 | 17 33.5 | + 0 45 58 | —0.4195 | .5616 | +.1813 | —9.5692 | .9679 |
| 24 | 27 Capricor. | 6 | —23 | —90 | 17 59.1 | + 1 11 40 | —0.9945 | .5630 | +.1836 | —9.5570 | .9698 |
| 24 | φ Capricor. | 6 | +12 | —68 | 20 35.7 | + 3 41 32 | —0.3947 | .5598 | +.1879 | —9.5591 | .9694 |
| 25 | 33 Capricor. | 6 | +61 | —16 | 0 16.0 | + 7 13 54 | +0.5316 | .5539 | +.1963 | —9.5633 | .9688 |
| 25 | 35 Capricor. | 6 | +68 | +26 | 1 36.4 | + 8 31 24 | +1.1601 | .5511 | +.1984 | —9.5701 | .9677 |
| 25 | 37 Capricor. | 6 | +69 | — 6 | 4 55.6 | +11 43 32 | +0.7117 | .5517 | +.2065 | —9.5488 | .9710 |
| 25 | ι Capricor. | 4½ | +49 | —29 | 5 54.4 | —11 19 46 | +0.2844 | .5513 | +.2084 | —9.5363 | .9727 |
| 25 | κ Capricor. | 5 | +45 | —34 | 8 21.6 | — 8 57 49 | +0.1949 | .5508 | +.2121 | —9.5240 | .9743 |
| 25 | B.A.C. 7550 | 6 | +70 | +14 | 8 35.6 | — 8 44 21 | +1.0202 | .5480 | +.2121 | —9.5398 | .9722 |
| 25 | 29 Aquarii | 6 | +48 | —32 | 17 9.3 | — 0 28 36 | +0.2264 | .5459 | +.2280 | —9.4818 | .9791 |
| 26 | 50 Aquarii | 6 | — 5 | —90 | 3 7.1 | + 9 8 41 | —0.8874 | .5435 | +.2434 | —9.3914 | .9864 |
| 26 | B.A.C. 7835 | 6½ | — 8 | —90 | 5 39.7 | +11 36 3 | —0.8973 | .5441 | +.2468 | —9.3729 | .9876 |
| 26 | 56 Aquarii | 6 | +65 | 0 | 5 46.1 | +11 42 14 | +0.8424 | .5388 | +.2462 | —9.4219 | .9843 |
| 26 | 70 Aquarii | 6 | —20 | —90 | 14 10.6 | — 4 10 10 | —1.1036 | .5390 | +.2575 | —9.2927 | .9915 |
| 26 | 74 Aquarii | 6 | +65 | —15 | 16 28.6 | — 1 56 47 | +0.5715 | .5351 | +.2598 | —9.3312 | .9899 |
| 27 | $\psi^1$ Aquarii | 4½ | +70 | — 2 | 2 56.0 | + 8 9 52 | +0.8032 | .5311 | +.2704 | —9.2340 | .9935 |
| 27 | χ Aquarii | 5½ | +20 | —70 | 3 24.3 | + 8 37 11 | —0.4454 | .5332 | +.2705 | —9.1702 | .9952 |
| 27 | $\psi^2$ Aquarii | 4½ | +80 | +21 | 3 54.3 | + 9 6 18 | +1.1636 | .5305 | +.2713 | —9.2382 | .9934 |
| 27 | 24 Piscium | 6½ | +27 | —62 | 20 28.6 | + 1 8 8 | —0.3218 | .5300 | +.2813 | —8.8385 | .9990 |
| 28 | 27 Piscium | 5 | +86 | 0 | 23 12.3 | + 2 46 31 | +0.8545 | .5292 | +.2825 | —8.8804 | 9987 |
| 28 | 29 Piscium | 5½ | +83 | — 6 | 0 42.2 | + 5 13 30 | +0.7447 | .5290 | +.2828 | —8.8238 | 9.9990 |
| 28 | JUPITER | | +10 | —88 | 10 39.6 | —10 8 23 | —0.6677 | .5236 | +.2823 | +7.8349 | 0.0000 |
| 28 | 44 Piscium | 6 | —14 | —89 | 11 53.5 | — 7 56 54 | —1.0760 | .5299 | +.2849 | +8.3000 | 9.9999 |
| 28 | 10 Ceti | 6 | +13 | —83 | 12 28.0 | — 7 23 29 | —0.6151 | .5299 | +.2849 | +8.1705 | 0.0000 |
| 29 | B.A.C. 274 | 6½ | —17 | —84 | 4 6.2 | + 7 44 4 | —1.0967 | .5321 | +.2821 | +8.9974 | 9.9978 |
| 29 | 73 Piscium | 6½ | +70 | —21 | 6 28.0 | +10 1 17 | +0.4430 | .5341 | +.2814 | +8.9301 | .9984 |
| 29 | 77 Piscium *pr.* | 7 | +90 | +35 | 6 54.7 | +10 27 3 | +1.3131 | .5353 | +.2809 | +8.8586 | .9989 |
| 29 | *e* Piscium | 5½ | +90 | + 4 | 8 6.9 | +11 36 52 | +0.9026 | .5352 | +.2805 | +8.9305 | .9984 |
| 29 | ζ Piscium | 6 | +27 | —62 | 10 33.9 | —10 0 59 | —0.3432 | .5346 | +.2795 | +9.0742 | .9969 |
| 29 | 88 Piscium | 6½ | +65 | —24 | 11 1.9 | — 9 33 50 | +0.3688 | .5357 | +.2789 | +9.0358 | .9974 |
| 30 | 54 Ceti | 6 | +90 | — 1 | 3 34.9 | + 6 25 54 | +0.7866 | .5437 | +.2665 | +9.2535 | .9929 |
| 31 | 40 Arietis | 6 | +31 | —50 | 4 52.9 | + 6 50 51 | —0.2565 | .5571 | +.2310 | +9.4825 | .9789 |
| 31 | π Arietis | 5½ | +89 | — 3 | 5 13.5 | + 7 10 35 | +0.6474 | .5598 | +.2310 | +9.4625 | .9809 |
| 31 | $\varrho^2$ Arietis | 6 | +70 | —14 | 7 59.6 | + 9 50 44 | +0.3932 | .5613 | +.2257 | +9.4840 | .9788 |
| 31 | $\varrho^3$ Arietis | 6 | +90 | + 2 | 8 14.8 | +10 5 19 | +0.7358 | .5623 | +.2257 | +9.4772 | .9795 |
| 31 | 54 Arietis | 6½ | +90 | +20 | 13 17.4 | — 9 3 3 | +1.0698 | .5665 | +.2162 | +9.4956 | .9776 |
| 31 | δ Arietis | 4½ | +70 | —13 | 14 38.5 | — 7 45 1 | +0.4179 | .5649 | +.2143 | +9.5166 | .9752 |
| 31 | ζ Arietis | 4½ | +10 | —67 | 15 59.9 | — 6 26 37 | —0.6335 | .5626 | +.2101 | +9.5445 | .9715 |
| 31 | B A.C. 1032 | 6½ | +70 | —13 | 18 29 5 | — 4 2 29 | +0.4155 | .5678 | +.2061 | +9.5337 | .9730 |
| 31 | $\tau^1$ Arietis | .5 | +33 | —44 | 18 37.8 | — 3 54 34 | —0.2040 | .5654 | +.2056 | +9.5469 | .9712 |
| 31 | $\tau^2$ Arietis | 6 | +64 | —16 | 19 16.7 | — 3 17 6 | +0.3332 | .5684 | +.2040 | +9.5387 | .9723 |
| June 4 | 54 Aurigæ | 6 | +32 | —27 | 0 44.3 | — 0 52 45 | —0.2111 | .5824 | —.0153 | +9.6771 | .9444 |
| 4 | 28 Geminor. | 6 | —18 | —61 | 2 46.5 | + 1 4 39 | —1.0088 | .5772 | —.0211 | +9.6871 | .9413 |
| 4 | 47 Geminor. | 6 | +90 | +17 | 13 28.3 | +11 21 21 | +0.6970 | .5798 | —.0536 | +9.6584 | .9495 |
| 4 | 53 Geminor. | 6 | +15 | —48 | 15 17.4 | —10 53 43 | —0.5129 | .5723 | —.0594 | +9.6737 | .9453 |
| 4 | 59 Geminor. | 6½ | +16 | —48 | 18 47.9 | — 7 31 21 | —0.4946 | .5709 | —.0678 | +9.6704 | .9463 |
| 4 | ι Geminor. | 4 | + 4 | —61 | 19 15.9 | — 7 4 25 | —0.7062 | 0.5687 | —.0706 | +9.6728 | 9.9456 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| June 4 | *b*¹ Geminor. | 5½ | —32 | —62 | 20 44.8 | — 5 38 50 | —1.1617 | 0.5661 | —.0734 | +9.6775 | 9.9442 |
| 4 | *b*² Geminor. | 5½ | —14 | —62 | 20 56.9 | — 5 27 13 | —0.9640 | .5658 | —.0761 | +9.6746 | .9451 |
| 4 | B.A.C. 2472 | 6 | —14 | —62 | 21 17.8 | — 5 7 6 | —0.9924 | .5660 | —.0761 | +9.6746 | .9451 |
| 4 | υ Geminor. | 5 | +38 | —27 | 23 29.9 | — 2 59 58 | —0.1132 | .5691 | —.0816 | +9.6602 | .9490 |
| 5 | *c* Geminor. | 6 | +90 | +16 | 2 55.6 | + 0 17 57 | +0.7413 | .5696 | —.0922 | +9.6438 | .9532 |
| 5 | φ Geminor. | 5 | + 4 | —63 | 6 50.3 | + 4 4 1 | —0.7055 | .5609 | —.1000 | +9.6591 | .9494 |
| 5 | ω¹ Cancri | 6 | +69 | — 4 | 10 1.4 | + 7 8 6 | +0.3915 | .5622 | —.1100 | +9.6385 | .9544 |
| 5 | ω² Cancri | 6½ | +90 | +11 | 10 22.4 | + 7 28 21 | +0.6742 | .5638 | —.1101 | +9.6337 | .9555 |
| 5 | ψ¹ Cancri | 6½ | +12 | —59 | 13 59.6 | +10 57 39 | —0.5729 | .5544 | —.1198 | +9.6460 | .9526 |
| 5 | ψ² Cancri | 4 | +31 | —38 | 14 6.5 | +11 4 16 | —0.2423 | .5560 | —.1198 | +9.6410 | .9539 |
| 5 | λ Cancri | 6 | +90 | +14 | 18 31.1 | — 8 40 33 | +0.7749 | .5572 | —.1291 | +9.6173 | .9591 |
| 5 | υ¹ Cancri | 7 | +36 | —34 | 21 11.9 | — 6 5 26 | —0.1459 | .5502 | —.1358 | +9.6260 | .9572 |
| 5 | υ² Cancri | 6½ | +53 | —20 | 22 4.1 | — 5 15 7 | +0.1463 | .5503 | —.1380 | +9.6197 | .9586 |
| 5 | B.A.C. 2840 | 7 | +37 | —34 | 22 32.0 | — 4 48 14 | —0.1326 | .5495 | —.1381 | +9.6230 | .9579 |
| 5 | υ³ Cancri | 6 | +46 | —26 | 23 21.5 | — 4 0 24 | +0.0264 | .5493 | —.1403 | +9.6188 | .9588 |
| 6 | 32 Cancri | 7 | +40 | —31 | 0 1.3 | — 3 22 5 | —0.0757 | .5479 | —.1424 | +9.6190 | .9588 |
| 6 | ξ Cancri | 5 | +10 | —65 | 16 41.5 | —11 15 39 | —0.6328 | .5316 | —.1740 | +9.5852 | .9652 |
| 6 | 79 Cancri | 6 | + 8 | —67 | 17 9.6 | —10 48 30 | —0.6643 | .5301 | —.1756 | +9.5843 | .9654 |
| 6 | B.A.C. 3138 | 6 | +34 | —41 | 18 43.4 | — 9 17 48 | —0.1817 | .5316 | —.1774 | +9.5712 | .9675 |
| 7 | η Leonis | 3½ | + 8 | —72 | 21 19.6 | — 7 31 17 | —0.6744 | .5079 | —.2164 | +9.4773 | .9795 |
| 8 | 42 Leonis | 6 | +22 | —61 | 4 53.9 | — 0 11 23 | —0.4198 | .5026 | —.2251 | +9.4323 | .9835 |
| 8 | B.A.C. 3579 | 6 | +14 | —70 | 8 35.4 | + 3 24 46 | —0.5733 | .5007 | —.2281 | +9.4151 | .9848 |
| 8 | *i* Leonis | 6 | + 4 | —73 | 10 23.4 | + 5 9 39 | —0.7637 | .4990 | —.2300 | +9.4094 | .9852 |
| 8 | *l* Leonis | 5 | +90 | +13 | 19 36.7 | — 9 52 46 | +0.9945 | .4970 | —.2378 | +9.2923 | .9915 |
| 9 | B.A.C. 3837 | 6½ | +66 | —23 | 9 17.1 | + 3 25 7 | +0.3841 | .4889 | —.2471 | +9.1869 | .9948 |
| 10 | *b* Virginis | 6 | —39 | —86 | 11 21.1 | + 4 47 19 | —1.3555 | .4809 | —.2569 | +8.8906 | .9987 |
| 10 | 10 Virginis | 6 | 0 | —88 | 16 56.3 | +10 13 41 | —0.8569 | .4809 | —.2579 | +8.6735 | 9 9995 |
| 10 | 13 Virginis | 6 | +90 | — 3 | 22 6.0 | — 8 44 46 | +0 7902 | .4812 | —.2584 | +6.2984 | 0.0000 |
| 10 | η Virginis | 3½ | +72 | —20 | 22 49.0 | — 8 2 52 | +0.4718 | .4812 | —.2584 | +7.3604 | 0.0000 |
| 11 | 38 Virginis | 6 | —27 | —90 | 17 53.6 | +10 31 35 | —1.2457 | .4773 | —.2568 | —8.6837 | 9.9935 |
| 12 | *h* Virginis | 6 | +68 | —20 | 16 9.9 | + 8 11 59 | +0.4584 | .4905 | —.2486 | —9.2140 | .9941 |
| 12 | 86 Virginis | 6 | +79 | +25 | 23 14.4 | — 8 55 15 | +1.2153 | .4917 | —.2445 | —9.3072 | .9909 |
| 14 | B.A.C. 4896 | 6 | + 3 | —90 | 9 25.6 | + 0 16 18 | —0.6569 | .5192 | —.2119 | —9.4707 | .9802 |
| 14 | ι¹ Libræ | 4½ | + 9 | —75 | 19 30.6 | +10 2 27 | —0.4929 | .5273 | —.1981 | —9.5180 | .9751 |
| 14 | ι² Libræ | 6½ | — 5 | —90 | 20 2.7 | +10 33 33 | —0.7551 | .5292 | —.1965 | —9.5148 | .9754 |
| 15 | B.A C. 5253 | 6 | +66 | +31 | 14 53.5 | + 4 47 17 | +1.2173 | .5393 | —.1813 | —9.6110 | .9604 |
| 15 | B.A.C. 5254 | 6 | +63 | —10 | 14 55.4 | + 4 49 5 | +0.6156 | .5415 | —.1635 | —9.6015 | .9622 |
| 15 | δ Scorpii | 2½ | —52 | —90 | 17 50.9 | + 7 38 38 | —1.2900 | .5502 | —.1582 | —9 5775 | .9665 |
| 16 | 19 Scorpii | 5½ | —20 | —90 | 2 48.2 | — 7 42 48 | —0.8986 | .5565 | —.1395 | —9.6062 | .9613 |
| 16 | σ Scorpii | 3½ | +60 | —12 | 3 0.6 | — 7 30 45 | +0.5968 | .5516 | —.1381 | —9.6299 | .9564 |
| 16 | α Scorpii | 1½ | +64 | +18 | 6 33.6 | — 4 5 23 | +1.0406 | .5518 | —.1315 | —9.6436 | .9533 |
| 16 | 22 Scorpii | 5 | + 5 | —70 | 6 56.5 | — 3 43 16 | —0.4105 | .5595 | —.1289 | —9.6227 | .9580 |
| 16 | 25 Scorpii | 6 | —16 | —90 | 14 2.9 | + 3 7 45 | —0.7727 | .5668 | —.1120 | —9 6303 | .9563 |
| 17 | A Ophiuchi | 5 | —17 | —90 | 1 56.2 | — 9 25 27 | —0 7382 | .5754 | —.0806 | —9.6478 | .9522 |
| 17 | 43 Ophiuchi | 6 | +62 | — 3 | 5 8.4 | — 6 20 32 | +0.7161 | .5699 | —.0723 | —9.6716 | .9459 |
| 17 | 3 Sagittarii | 5 | +13 | —50 | 14 56.2 | + 3 4 38 | —0.1024 | .5796 | —.0436 | —9.6684 | .9469 |
| 17 | B.A.C. 6127 | 5 | +36 | —24 | 23 6.0 | +10 55 18 | +0.3600 | .5802 | —.0198 | —9.6782 | .9440 |
| 18 | B.A.C. 6194 | 5½ | —50 | —90 | 3 5.3 | — 9 14 47 | —1.1384 | .5892 | —.0077 | —9.6584 | .9496 |
| 18 | φ Sagittarii | 3½ | —37 | —90 | 13 57.0 | + 1 11 7 | —0.9917 | .5905 | +.0261 | —9.6590 | .9494 |
| 18 | τ Sagittarii | 3½ | +24 | —39 | 22 17.7 | + 9 11 50 | +0.0856 | .5851 | +.0507 | —9.6698 | .9465 |
| 19 | B.A.C. 6628 | 6 | +62 | + 1 | 5 11.5 | — 8 10 46 | +0.7791 | .5804 | +.0720 | —9.6736 | .9454 |
| 19 | B.A.C. 6666 | 6 | +24 | —36 | 7 24.0 | — 6 3 23 | +0.0499 | .5837 | +.0779 | —9.6611 | .9488 |
| 19 | ω Sagitarii | 5½ | +44 | —23 | 17 38.8 | + 3 47 5 | +0.3832 | .5793 | +.1073 | —9.6522 | .9512 |
| 19 | A Sagitarii | 5 | +47 | —21 | 18 53.3 | + 4 58 37 | +0.4216 | .5772 | +.1130 | —9.6445 | .9530 |
| 20 | B.A.C. 7077 | 6 | +65 | +17 | 8 36.5 | — 5 50 5 | +1.0268 | 0.5709 | +.1486 | —9.6328 | 9.9558 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log. cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| June 20 | B.A.C. 7197 | 6 | +20 | −55 | 15 1.1 | + 0 19 56 | −0.1913 | 0.5706 | +.1659 | −9.5964 | 9 9632 |
| 20 | B.A.C. 7239 | 6 | +66 | +33 | 16 55.3 | + 2 9 52 | +1.2117 | .5633 | +.1706 | −9.6147 | .9597 |
| 20 | B.A C. 7335 | 6 | +20 | −58 | 23 28.3 | + 8 28 13 | −0.2354 | .5658 | +.1845 | −9.5692 | .9679 |
| 20 | 27 Capricor. | 6 | −11 | −90 | 23 53.6 | + 8 52 34 | −0.8089 | .5671 | +.1867 | −9.5568 | .9698 |
| 21 | φ Capricor. | 6 | + 4 | −79 | 2 28.0 | +11 21 17 | −0.5465 | .5640 | +.1867 | −9.5591 | .9695 |
| 21 | 33 Capricor. | 6 | +69 | − 5 | 6 5.5 | − 9 9 15 | +0.7194 | .5576 | +.1995 | −9.5632 | .9688 |
| 21 | 37 Capricor. | 6 | +70 | + 6 | 8 41.7 | − 6 43 20 | +0.9061 | .5550 | +.2048 | −9.5488 | .9710 |
| 21 | ι Capricor. | 4½ | +60 | −19 | 11 39.8 | − 3 47 3 | +0.4808 | .5543 | +.2114 | −9.5362 | .9727 |
| 21 | κ Capricor. | 5 | +57 | −22 | 14 4.8 | − 1 27 11 | +0.3959 | .5538 | +.2153 | −9.5239 | .9743 |
| 21 | B.A.C. 7550 | 6 | +70 | +30 | 14 19.1 | − 1 13 26 | +1.2176 | .5511 | +.2153 | −9.5397 | 9722 |
| 21 | 29 Aquarii | 6 | +59 | −21 | 22 47.9 | + 6 57 21 | +0.4374 | .5492 | +.2293 | −9.4817 | .9791 |
| 22 | 50 Aquarii | 6 | + 5 | −89 | 8 41.4 | − 7 29 41 | −0.6631 | .5458 | +.2443 | −9.3919 | .9864 |
| 22 | B.A.C. 7835 | 6½ | + 5 | −88 | 11 13.1 | − 5 3 9 | −0.6556 | .5439 | +.2484 | −9.3729 | .9876 |
| 22 | 56 Aquarii | 6 | +75 | +15 | 11 19.5 | − 4 57 0 | +1.0649 | .5398 | +.2484 | −9.4219 | .9843 |
| 22 | 70 Aquarii | 6 | − 5 | −90 | 19 42.5 | + 3 9 0 | −0.8712 | .5401 | +.2580 | −9.2925 | .9915 |
| 22 | 74 Aquarii | 6 | +67 | − 2 | 22 0.0 | + 5 21 57 | +0.8039 | .5349 | +.2612 | −9.3311 | .9898 |
| 23 | $\psi^1$ Aquarii | 4½ | +80 | +12 | 8 27.6 | − 8 31 12 | +1.0428 | .5309 | +.2705 | −9.2340 | .9935 |
| 23 | χ Aquarii | 5½ | +32 | −55 | 8 56.5 | − 8 3 14 | −0.2046 | .5323 | +.2710 | −9.1701 | .9952 |
| 23 | $\psi^2$ Aquarii | 4½ | +80 | +49 | 9 26.2 | − 7 34 29 | +1.4048 | .5301 | +.2709 | −9.2382 | .9934 |
| 23 | 20 Piscium | 6 | −35 | −90 | 23 42.5 | + 6 14 1 | −1.0275 | .5290 | +.2790 | −8.7720 | .9992 |
| 24 | 24 Piscium | 6½ | +40 | −49 | 2 5.5 | + 8 32 25 | −0.0806 | .5287 | +.2801 | −8.8381 | .9990 |
| 24 | 27 Piscium | 5 | +86 | +16 | 5 50.4 | −11 48 1 | +1.0998 | .5271 | +.2809 | −8.8801 | .9987 |
| 24 | 29 Piscium | 5½ | +86 | + 8 | 6 21.4 | −11 19 57 | +0.9899 | .5264 | +.2812 | −8.8232 | .9990 |
| 24 | B.A.C. 8365 | 6½ | −18 | −90 | 7 54.4 | − 9 49 51 | −1.1272 | .5271 | +.2817 | −8.3558 | 9.9999 |
| 24 | 10 Ceti | 6 | +89 | +33 | 18 10.3 | + 0 6 19 | +1.0273 | .5264 | +.2825 | −8.1773 | 0.0000 |
| 25 | JUPITER | | +47 | −41 | 23 3.4 | + 4 50 0 | +0.0559 | .5211 | +.2798 | +8.4880 | 9.9998 |
| 25 | B.A.C. 221 | 6 | −23 | −86 | 4 36.3 | +10 12 18 | −1.1970 | .5255 | +.2808 | +8.8986 | .9986 |
| 25 | B.A.C. 274 | 6½ | + 1 | −85 | 10 7.4 | − 8 27 14 | −0.8298 | .5275 | +.2786 | +8.9977 | .9978 |
| 25 | 73 Piscium | 6½ | +88 | − 9 | 12 31.6 | − 6 7 40 | +0.6707 | .5290 | +.2778 | +8.9301 | .9984 |
| 25 | *e* Piscium | 5½ | +90 | +19 | 14 12.5 | − 4 30 4 | +1.1329 | .5301 | +.2768 | +8.9306 | .9984 |
| 25 | ζ Piscium | 6 | +38 | −50 | 16 41.3 | − 2 6 7 | −0.1253 | .5294 | +.2758 | +9.0740 | .9969 |
| 25 | 88 Piscium | 6½ | +81 | −13 | 17 9.9 | − 1 38 22 | +0.5879 | .5299 | +.2757 | +9.0358 | .9974 |
| 26 | 54 Ceti | 6 | +90 | +12 | 10 4.3 | − 9 17 19 | +0.9927 | .5381 | +.2615 | +9.2537 | .9929 |
| 27 | 27 Arietis | 6 | −36 | −73 | 4 10.7 | + 8 12 24 | −1.2909 | .5420 | +.2390 | +9.4676 | .9804 |
| 27 | 40 Arietis | 6 | +38 | −42 | 11 57.2 | − 8 17 17 | −0.1062 | .5503 | +.2263 | +9.4825 | .9790 |
| 27 | π Arietis | 5½ | +90 | + 6 | 12 18.2 | − 7 57 7 | +0.8069 | .5527 | +.2263 | +9.4626 | .9809 |
| 27 | $\rho^2$ Arietis | 6 | +79 | − 8 | 15 8.2 | − 5 13 4 | +0.5439 | .5541 | +.2212 | +9.4841 | .9788 |
| 27 | $\rho^3$ Arietis | 6 | +90 | +11 | 15 23.6 | − 4 58 11 | +0.8900 | .5525 | +.2212 | +9.4772 | .9775 |
| 27 | 54 Arietis | 6½ | +90 | +37 | 20 33.8 | + 0 1 1 | +1.2190 | .5594 | +.2120 | +9.4956 | .9776 |
| 27 | δ Arietis | 4½ | +80 | − 6 | 21 56.4 | + 1 20 36 | +0.5518 | .5590 | +.2083 | +9.5166 | .9752 |
| 27 | ζ Arietis | 4½ | +16 | −62 | 23 19.8 | + 2 40 59 | −0.5138 | .5558 | +.2060 | +9.5445 | .9716 |
| 28 | B A.C. 1032 | 6½ | +79 | − 6 | 1 52.8 | + 5 8 29 | +0.5386 | .5590 | +.2002 | +9.5338 | .9730 |
| 28 | $\tau^1$ Arietis | 5 | +40 | −37 | 2 1.4 | + 5 16 41 | −0.8468 | .5494 | +.2002 | +9.5469 | .9713 |
| 28 | $\tau^2$ Arietis | 6 | +73 | −10 | 2 41.7 | + 5 55 29 | +0.4583 | .5609 | +.2002 | +9.5387 | .9724 |
| 28 | 65 Arietis | 6 | +79 | − 6 | 3 23.6 | + 6 36 55 | +0.5294 | .5619 | +.1981 | +9.5400 | .9722 |
| 28 | 66 Arietis | 6½ | −30 | −68 | 5 2.9 | + 8 11 38 | −1.2017 | .5571 | +.1939 | +9.5793 | .9662 |
| 28 | 9 Tauri | 6 | −10 | −68 | 8 37.7 | +11 38 30 | −0.9517 | .5594 | +.1875 | +9.5871 | .9649 |
| 28 | *b* Pleiadum | 5½ | −45 | −67 | 11 54.6 | − 9 11 55 | −1.2984 | .5607 | +.1784 | +9.6034 | .9619 |
| 28 | 1 Pleiadum | 8 | −29 | −67 | 12 8.6 | − 8 58 21 | −1.1787 | .5612 | +.1779 | +9.6021 | .9621 |
| 28 | 3 Pleiadum | 9 | −33 | −67 | 12 12.5 | − 8 54 38 | −1.2167 | .5612 | +.1777 | +9.6030 | .9620 |
| 28 | 7 Pleiadum | 8 | −26 | −67 | 12 19.2 | − 8 49 11 | −1.1524 | .5614 | +.1775 | +9.6022 | .9621 |
| 28 | B.A.C. 1155 | 7 | +31 | −43 | 12 19.4 | − 8 48 1 | −0.2404 | .5652 | +.1775 | +9.5864 | .9650 |
| 28 | 9 Pleiadum | 8½ | −41 | −66 | 12 29.1 | − 8 38 38 | −1.2753 | .5610 | +.1771 | +9.6048 | .9616 |
| 28 | *d* Pleiadum | 5 | −16 | −67 | 12 31.0 | − 8 36 52 | −1.0259 | .5621 | +.1771 | +9.6007 | .9624 |
| 28 | 10 Pleiadum | 8 | −57 | −66 | 12 33.7 | − 8 34 14 | −1.3317 | 0.5609 | +.1769 | +9.6060 | 9.9614 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| June 28 | 11 Pleiadum | 8½ | −27 | −67 | 12 38.9 | − 8 29 11 | −1.1614 | 0.5617 | +.1768 | +9.6033 | 9.9619 |
| 28 | 13 Pleiadum | 8½ | −15 | −67 | 12 49.4 | − 8 19 6 | −1.0214 | .5622 | +.1764 | +9.6016 | .9622 |
| 28 | 14 Pleiadum | 9 | + 1 | −67 | 12 51.9 | − 8 16 43 | −0.7802 | .5634 | +.1762 | +9.5975 | .9630 |
| 28 | 15 Pleiadum | 8½ | −26 | −67 | 12 54.4 | − 8 14 19 | −1.1434 | .5618 | +.1761 | +9.6039 | .9618 |
| 28 | 16 Pleiadum | 9½ | − 2 | −67 | 12 54.8 | − 8 13 52 | −0.8241 | .5631 | +.1761 | +9.5984 | .9628 |
| 28 | 17 Pleiadum | 8 | + 4 | −67 | 12 55.4 | − 8 13 19 | −0.7291 | .5643 | +.1761 | +9.5968 | .9632 |
| 28 | 18 Pleiadum | 8 | −26 | −67 | 12 55.5 | − 8 13 14 | −1.1511 | .5619 | +.1761 | +9.6040 | .9618 |
| 28 | *p* Pleiadum | 7½ | −24 | −67 | 12 56.2 | − 8 12 31 | −1.1256 | .5619 | +.1760 | +9.6036 | .9618 |
| 28 | 19 Pleiadum | 8 | + 9 | −65 | 12 56.6 | − 8 12 9 | −0.6346 | .5640 | +.1760 | +9.5952 | .9634 |
| 28 | 22 Pleiadum | 8 | − 8 | −67 | 12 57.9 | − 8 10 56 | −0.9177 | .5629 | +.1760 | +9.6001 | .9625 |
| 28 | 23 Pleiadum | 8½ | + 7 | −51 | 12 59.2 | − 8 9 39 | −0.6694 | .5639 | +.1759 | +9.5960 | .9633 |
| 28 | 24 Pleiadum | 8 | −45 | −66 | 12 59.5 | − 8 9 23 | −1.2921 | .5613 | +.1759 | +9.6066 | .9613 |
| 28 | η Tauri | 3 | −22 | −67 | 12 56.6 | − 8 9 18 | −1.1048 | .5621 | +.1759 | +9.6034 | .9619 |
| 28 | 25 Pleiadum | 8½ | +12 | −62 | 13 3.4 | − 8 5 40 | −0 5880 | .5643 | +.1759 | +9.5947 | .9635 |
| 28 | 26 Pleiadum | 9 | +16 | −58 | 13 5.9 | − 8 3 14 | −0.5125 | .5645 | +.1758 | +9.5936 | .9637 |
| 28 | 27 Pleiadum | 8½ | −41 | −66 | 13 18.1 | − 7 51 25 | −1.2706 | .5614 | +.1756 | +9.6071 | .9612 |
| 28 | 28 Pleiadum | 7 | +25 | −49 | 13 21.6 | − 7 48 8 | −0.3687 | .5652 | +.1755 | +9.5913 | .9641 |
| 28 | 29 Pleiadum | 8 | −42 | −66 | 13 24.6 | − 7 45 15 | −1.2803 | .5614 | +.1755 | +9.6076 | .9611 |
| 28 | *s* Pleiadum | 7½ | + 3 | −65 | 13 36.3 | − 7 33 59 | −0.7489 | .5636 | +.1752 | +9.5992 | .9627 |
| 28 | *f* Pleiadum | 4½ | − 9 | −67 | 13 41.5 | − 7 29 0 | −0.9341 | .5629 | +.1750 | +9.6026 | .9621 |
| 28 | *h* Pleiadum | 5½ | −15 | −67 | 13 41.9 | − 7 28 32 | −1.0179 | .5623 | +.1750 | +9.6041 | .9617 |
| 28 | 30 Pleiadum | 8½ | + 2 | −63 | 13 42.7 | − 7 27 49 | −0.7608 | .5636 | +.1750 | +9.5997 | .9626 |
| 28 | 31 Pleiadum | 8 | −45 | −66 | 13 43.9 | − 7 26 38 | −1.2948 | .5613 | +.1750 | +9.6088 | .9608 |
| 28 | 32 Pleiadum | 8 | −39 | −66 | 13 46.0 | − 7 24 39 | −1.2569 | .5558 | +.1750 | +9.6083 | .9610 |
| 28 | 33 Pleiadum | 8½ | −23 | −66 | 13 47.9 | − 7 22 46 | −1.1146 | .5621 | +.1750 | +9.6060 | .9614 |
| 28 | 34 Pleiadum | 7½ | +15 | −60 | 13 55.9 | − 7 15 4 | −0.5450 | .5645 | +.1748 | +9.5967 | .9632 |
| 28 | 35 Pleiadum | 9 | −21 | −66 | 13 56.3 | − 7 13 44 | −1.0874 | .5622 | +.1747 | +9.6059 | .9614 |
| 28 | 36 Pleiadum | 9 | −18 | −66 | 13 59.9 | − 7 11 12 | −1.0495 | .5625 | +.1746 | +9.6055 | .9615 |
| 28 | 37 Pleiadum | 8 | −30 | −66 | 14 0.5 | − 7 10 41 | −1.1830 | .5619 | +.1744 | +9.6077 | .9611 |
| 28 | 38 Pleiadum | 8 | + 8 | −66 | 14 1.8 | − 7 9 27 | −0.6685 | .5640 | +.1743 | +9.5991 | .9627 |
| 28 | B.A.C. 1189 | 7 | +90 | +22 | 14 2.7 | − 7 10 32 | +0.9716 | .5708 | +.1742 | +9.5699 | .9678 |
| 28 | 39 Pleiadum | 8 | −46 | −66 | 14 13.3 | − 6 58 18 | −1.2969 | .5616 | +.1741 | +9.6103 | .9606 |
| 28 | 40 Pleiadum | 7½ | − 7 | −67 | 14 24.1 | − 6 47 55 | −0.8956 | .5639 | +.1739 | +9.6011 | .9623 |
| 28 | 32 Tauri | 6 | +90 | +42 | 16 54.6 | − 4 23 2 | +1.2028 | .5740 | +.1667 | +9.5747 | .9670 |
| 28 | 33 Tauri | 6 | +15 | −58 | 16 58.8 | − 4 19 2 | −0.5187 | .5713 | +.1670 | +9.5875 | .9648 |
| 28 | 36 Tauri | 6½ | +46 | −28 | 19 57.4 | − 1 27 12 | +0.0236 | .5709 | +.1594 | +9.6043 | .9617 |
| 29 | χ Tauri | 5½ | +17 | −53 | 3 20.0 | + 5 38 35 | −0.4884 | .5721 | +.1414 | +9.6306 | .9563 |
| 30 | B.A.C. 1648 | 6½ | +13 | −52 | 2 31.0 | + 3 55 17 | −0.5491 | .5801 | +.0764 | +9.6688 | .9467 |
| 30 | β Tauri | 2 | −25 | −63 | 4 34.9 | + 5 54 15 | −1.0935 | .5780 | +.0704 | +9.6784 | .9440 |
| 30 | B.A.C. 1746 | 6½ | +50 | −14 | 8 24.0 | + 9 34 20 | +0.0959 | .5847 | +.0583 | +9.6654 | .9477 |
| 30 | 136 Tauri | 5 | +71 | + 4 | 15 13.2 | − 7 52 44 | +0.4173 | .5861 | +.0370 | +9.6655 | .9476 |
| July 4 | ξ Cancri | 5 | − 1 | −68 | 1 22.5 | − 0 46 48 | −0.8128 | .5336 | −.1771 | +9.5851 | .9652 |
| 4 | 79 Cancri | 6 | − 3 | −68 | 1 50.3 | − 0 19 51 | −0.8451 | .5339 | −.1771 | +9 5844 | .9654 |
| 4 | B.A.C. 3138 | 6 | +25 | −51 | 3 23.6 | + 1 10 19 | −0.3661 | .5333 | −.1806 | +9.5713 | .9675 |
| 5 | η Leonis | 3½ | − 5 | −73 | 5 49.2 | + 2 46 13 | −0.9068 | .5023 | −.2185 | +9.4773 | .9795 |
| 5 | 37 Leonis | 6 | +90 | +42 | 10 40.5 | + 7 28 47 | +1.3083 | .5124 | −.2242 | +9.3970 | .9860 |
| 5 | 42 Leonis | 6 | + 9 | −74 | 3 20.3 | +10 3 55 | −0.6639 | .5055 | −.2273 | +9.4323 | .9835 |
| 5 | B.A.C. 3579 | 6 | + 1 | −75 | 17 0.3 | −10 22 31 | −0.8102 | .5022 | −.2311 | +9.4151 | .9848 |
| 5 | ι Leonis | 6 | −17 | −75 | 18 47.5 | − 8 38 23 | −1.0909 | .5016 | −.2321 | +9.4095 | .9852 |
| 6 | *l* Leonis | 5 | +90 | − 3 | 3 57.1 | + 0 15 33 | +0.7268 | .4984 | −.2405 | +9.2923 | .9915 |
| 6 | B.A.C. 3837 | 6½ | +50 | −37 | 17 33.5 | −10 30 47 | +0.0996 | .4907 | −.2488 | +9.1871 | .9948 |
| 6 | σ Leonis | 4 | +90 | +40 | 21 31.9 | − 6 38 46 | +1.3431 | .4903 | −.2507 | +9.0744 | .9969 |
| 8 | 10 Virginis | 6 | −20 | −87 | 1 6.1 | − 3 48 41 | −1.1590 | .4813 | −.2583 | +8.6739 | 9.9995 |
| 8 | 13 Virginis | 6 | +73 | −19 | 6 14.5 | + 1 11 37 | +0.4912 | .4812 | −.2585 | +6.3139 | 0.0000 |
| 8 | η Virginis | 3½ | +53 | −36 | 6 58.8 | + 1 54 41 | +0.1678 | 0.4811 | −.2585 | +7.3610 | 0.0000 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log. cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| July 9 | Mars |  | +69 | — 2 | 15 41.5 | + 9 45 33 | +0.8060 | 0.4658 | —.2429 | —9.1448 | 9 9957 |
| 10 | *h* Virginis | 6 | +52 | —36 | 0 26.1 | — 5 44 1 | +0.1694 | .4751 | —.2471 | —9.2140 | .9941 |
| 10 | 86 Virginis | 6 | +79 | + 6 | 7 34.4 | + 1 12 32 | +0.9360 | .4907 | —.2429 | —9.3072 | .9909 |
| 11 | B.A.C. 4896 | 6 | —11 | —90 | 17 59.8 | +10 38 22 | —0.8900 | .5172 | —.2087 | —9.4707 | .9802 |
| 12 | $\iota^1$ Libræ | 4½ | — 3 | —90 | 4 9.1 | — 3 31 6 | —0.7086 | .5254 | —.1949 | —9.5180 | .9750 |
| 12 | $\iota^2$ Libræ | 6½ | —18 | —90 | 4 41.5 | — 2 59 47 | —0.9705 | .5258 | —.1948 | —9.5148 | .9754 |
| 12 | 42 Libræ | 5½ | +67 | +43 | 17 24.0 | + 9 18 10 | +1.2823 | .5299 | —.1734 | —9.5981 | .9629 |
| 12 | B.A C. 5253 | 6 | +66 | +17 | 23 39.3 | — 8 39 1 | +1.0433 | .5358 | —.1623 | —9.6110 | .9604 |
| 12 | B.A.C. 5254 | 6 | +53 | —20 | 23 41.2 | — 8 37 15 | +0.4408 | .5380 | —.1623 | —9.6016 | .9622 |
| 13 | B.A.C. 5335 | 6½ | —12 | —90 | 5 11.7 | — 3 17 57 | —0.7724 | .5485 | —.1503 | —9.5957 | .9633 |
| 13 | B.A.C. 5354 | 6½ | —16 | —90 | 6 22.1 | — 2 10 0 | —0.8502 | .5499 | —.1482 | —9.5973 | .9631 |
| 13 | 19 Scorpii | 5½ | —39 | —90 | 11 37.2 | + 2 54 8 | —1.0659 | .5550 | —.1374 | —9.6063 | .9613 |
| 13 | σ Scorpii | 3½ | +51 | —19 | 11 49.5 | + 3 6 2 | +0.4464 | .5507 | —.1353 | —9.6300 | .9564 |
| 13 | α Scorpii | 1½ | +64 | + 8 | 15 23.0 | + 6 31 59 | +0.8978 | .5507 | —.1284 | —9.6436 | .9532 |
| 13 | 22 Scorpii | 5 | — 2 | —43 | 15 46.0 | + 6 54 11 | —0.5524 | .5567 | —.1283 | —9.6227 | .9580 |
| 13 | 25 Scorpii | 6 | —23 | —90 | 22 53.3 | —10 13 58 | —0.8982 | .5528 | —.1092 | —9.6303 | .9563 |
| 14 | A Ophiuchi | 5 | —23 | —90 | 10 46.6 | + 1 12 52 | —0.8366 | .5740 | —.0806 | —9.6478 | .9522 |
| 14 | 43 Ophiuchi | 6 | +56 | — 9 | 13 58.4 | + 4 17 20 | +0.6230 | .5704 | —.0696 | —9.6716 | .9459 |
| 14 | 3 Sagittarii | 5 | + 9 | —55 | 23 44.3 | —10 19 19 | —0.1720 | .5794 | —.0438 | —9.6684 | .9469 |
| 15 | B.A.C. 6127 | 5 | +32 | —27 | 7 51.5 | — 2 31 18 | +0.3071 | .5812 | —.0199 | —9.6782 | .9440 |
| 15 | B.A.C. 6194 | 5½ | —53 | —90 | 11 49.2 | + 1 16 56 | —1.1760 | .5907 | —.0076 | —9.6584 | .9496 |
| 15 | φ Sagittarii | 3½ | —39 | —90 | 22 35.0 | +11 36 58 | —1.0104 | .5933 | +.0238 | —9.6590 | .9494 |
| 16 | τ Sagittarii | 3½ | +23 | —29 | 6 50.0 | — 4 28 2 | +0.0880 | .5883 | +.0517 | —9.6698 | .9464 |
| 16 | B.A.C. 6628 | 6 | +62 | + 2 | 13 38.3 | + 2 3 50 | +0.7911 | .5847 | +.0734 | —9.6736 | .9454 |
| 16 | B.A.C. 6666 | 6 | +25 | —40 | 15 44.6 | + 4 5 1 | +0.0684 | .5880 | +.0796 | —9.6611 | .9488 |
| 17 | ω Sagittarii | 5½ | +47 | —20 | 1 52.9 | —10 11 0 | +0.4289 | .5834 | +.1128 | —9.6522 | .9511 |
| 17 | A Sagittarii | 5 | +50 | —18 | 3 7.1 | — 8 59 47 | +0.4707 | .5830 | +.1158 | —9.6508 | .9515 |
| 17 | B.A.C. 7077 | 6 | +65 | +23 | 16 35.0 | + 3 56 13 | +1.1051 | .5777 | +.1530 | —9.6228 | .9557 |
| 17 | B.A.C. 7197 | 6 | +25 | —49 | 22 51.8 | + 9 58 21 | —0.0889 | .5777 | +.1681 | —9.5965 | .9632 |
| 18 | B.A.C. 7335 | 6 | +26 | —51 | 7 8.2 | — 6 4 13 | —0.1123 | .5720 | +.1899 | —9.5692 | .9679 |
| 18 | 27 Capricor. | 6 | — 3 | —90 | 7 33.0 | — 5 40 24 | —0.6787 | .5745 | +.1899 | —9.5569 | .9698 |
| 18 | φ Capricor. | 6 | +29 | —49 | 10 4.0 | — 3 15 3 | —0.0766 | .5673 | +.1967 | —9.5591 | .9694 |
| 18 | 33 Capricor. | 6 | +69 | + 3 | 13 36.6 | + 0 9 31 | +0.8472 | .5652 | +.2032 | —9.5632 | .9688 |
| 18 | 37 Capricor. | 6 | +70 | +15 | 18 6.5 | + 4 29 27 | +1.0421 | .5622 | +.2137 | —9.5488 | .9710 |
| 18 | ε Capricor. | 4½ | +68 | —11 | 19 3.3 | + 5 24 10 | +0.6247 | .5616 | +.2157 | —9.5362 | .9727 |
| 18 | κ Capricor. | 5 | +64 | —15 | 21 25.0 | + 7 40 39 | +0.5458 | .5612 | +.2197 | —9.5239 | .9743 |
| 19 | 29 Aquarii | 6 | +70 | —12 | 5 56.0 | — 8 6 56 | +0.6061 | .5548 | +.2358 | —9.4817 | .9791 |
| 19 | 50 Aquarii | 6 | +16 | —72 | 15 36.2 | + 1 12 42 | —0.4591 | .5523 | +.2496 | —9.3913 | .9864 |
| 19 | 56 Aquarii | 6 | +75 | +31 | 18 10.3 | + 3 41 22 | +1.2534 | .5461 | +.2539 | —9.4219 | .9843 |
| 20 | 70 Aquarii | 6 | + 7 | —87 | 2 21.6 | +11 35 40 | —0.6468 | .5461 | +.2634 | —9.2926 | .9915 |
| 20 | 74 Aquarii | 6 | +78 | +11 | 4 36.4 | —10 14 10 | +1.0158 | .5417 | +.2655 | —9.3316 | .9898 |
| 20 | $\psi^1$ Aquarii | 4½ | +80 | +30 | 14 50.5 | — 0 20 50 | +1.2703 | .5372 | +.2745 | —9.2339 | .9935 |
| 20 | χ Aquarii | 5½ | +44 | —42 | 15 19.1 | + 0 6 50 | +0.0376 | .5385 | +.2755 | —9.1699 | .9952 |
| 21 | 20 Piscium | 6 | —12 | —90 | 5 47.7 | — 9 53 20 | —1.0426 | .5341 | +.2828 | —8.7718 | .9992 |
| 21 | 27 Piscium | 5 | +86 | +39 | 10 50.3 | — 5 0 44 | +1.3536 | .5313 | +.2841 | —8.8800 | .9987 |
| 21 | 29 Piscium | 5½ | +86 | +27 | 12 19.7 | — 3 34 6 | +1.2480 | .5308 | +.2849 | —8.8242 | .9990 |
| 21 | 44 Piscium | 6 | +16 | —83 | 23 28.6 | — 7 12 57 | —0.5640 | .5300 | +.2853 | +8.3012 | .9999 |
| 22 | Jupiter |  | +87 | —11 | 7 51.8 | — 8 40 5 | +0.6492 | .5296 | +.2834 | +8.6066 | .9996 |
| 22 | B.A.C. 221 | 6 | — 3 | —86 | 10 17.2 | — 6 19 28 | —0.9105 | .5289 | +.2824 | +8.8988 | .9986 |
| 22 | B.A.C. 274 | 6½ | +17 | —76 | 15 45.2 | — 1 2 3 | —0.5451 | .5295 | +.2803 | +8.9976 | .9978 |
| 22 | 73 Piscium | 6½ | +90 | + 7 | 18 8.3 | + 1 16 22 | +0.9497 | .5314 | +.2787 | +8.9302 | .9984 |
| 22 | *e* Piscium | 5½ | +90 | +50 | 19 48.4 | + 2 53 15 | +1.4106 | .5319 | +.2781 | +8.9307 | .9984 |
| 22 | ζ Piscium | 6 | +53 | —35 | 22 17.2 | + 5 17 9 | +0.1555 | .5312 | +.2762 | +9.0744 | .9969 |
| 22 | 88 Piscium | 6½ | +90 | — 2 | 22 45.7 | + 5 44 42 | +0.8718 | .5319 | +.2762 | +9.0359 | .9974 |
| 23 | 54 Ceti | 6 | +90 | +54 | 15 35.7 | — 1 58 30 | +1.2677 | 0.5378 | +.2615 | +9.2538 | 9.9929 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| July 24 | 27 Arietis | 6 | −13 | −73 | 9 44.2 | − 8 26 47 | −1.0366 | 0.5400 | +.2381 | +9.4676 | 9.9804 |
| 24 | 40 Arietis | 6 | +53 | −24 | 17 34.0 | − 0 53 8 | +0.1596 | .5460 | +.2245 | +9.4821 | .9790 |
| 24 | π Arietis | 5½ | +90 | +22 | 17 55.1 | − 0 32 46 | +1 0600 | .5511 | +.2234 | +9.4626 | .9809 |
| 24 | $\rho^2$ Arietis | 6 | +90 | + 5 | 20 46.5 | + 2 12 36 | +0.7923 | .5512 | +.2199 | +9.4841 | .9789 |
| 24 | $\rho^3$ Arietis | 6 | +90 | +29 | 21 2.1 | + 2 22 40 | +1.1392 | .5528 | +.2181 | +9.4769 | .9795 |
| 25 | δ Arietis | 4½ | +90 | + 7 | 3 38.5 | + 8 50 4 | +0.7909 | .5549 | +.2069 | +9.5167 | .9752 |
| 25 | ζ Arietis | 4½ | +29 | −48 | 5 2.8 | +10 11 20 | −0.2815 | .5528 | +.2030 | +9.5445 | .9716 |
| 25 | B.A.C. 1032 | 6½ | +90 | + 6 | 7 37.9 | −11 19 4 | +0.7567 | .5572 | +.1990 | +9.5338 | .9730 |
| 25 | $\tau^1$ Arietis | 5 | +53 | −26 | 7 46.1 | −11 11 14 | +0.1454 | .5551 | +.1989 | +9.5468 | .9713 |
| 25 | $\tau^2$ Arietis | 6 | +90 | + 2 | 8 26.3 | −10 32 24 | +0.6889 | .5577 | +.1968 | +9.5387 | .9724 |
| 25 | 65 Arietis | 6 | +90 | + 7 | 8 9.1 | −10 51 12 | +0.7653 | .5586 | +.1948 | +9.5400 | .9722 |
| 25 | 66 Arietis | 6½ | −11 | −68 | 10 49.8 | − 8 14 9 | −0.9815 | .5525 | +.1927 | +9.5793 | .9662 |
| 25 | 9 Tauri | 6 | + 4 | −67 | 14 27.1 | − 4 44 44 | −0.7391 | .5556 | +.1841 | +9.5871 | .9649 |
| 25 | *g* Pleiadum | 3½ | −41 | −66 | 17 44.4 | − 1 34 34 | −1.2788 | .5549 | +.1775 | +9.6065 | .9613 |
| 25 | *b* Pleiadum | 5½ | −21 | −67 | 17 46.5 | − 1 32 36 | −1.0917 | .5556 | +.1775 | +9.6035 | .9619 |
| 25 | 1 Pleiadum | 8 | −11 | −67 | 18 0.8 | − 1 18 48 | −0.9712 | .5571 | +.1751 | +9.6021 | .9621 |
| 25 | 3 Pleiadum | 9 | −14 | −67 | 18 4.7 | − 1 15 3 | −1.0097 | .5564 | +.1763 | +9.6030 | .9620 |
| 25 | 4 Pleiadum | 8 | −40 | −66 | 18 5.7 | − 1 14 5 | −1.2665 | .5553 | +.1764 | +9.6073 | .9611 |
| 25 | 6 Pleiadum | 9 | −40 | −66 | 18 6.9 | − 1 12 57 | −1.1978 | .5555 | +.1761 | +9.6065 | .9613 |
| 25 | *e* Pleiadum | 5 | −43 | −66 | 18 10.2 | − 1 9 46 | −1.2868 | .5553 | +.1759 | +9.6079 | .9610 |
| 25 | 7 Pleiadum | 8 | −10 | −67 | 18 11.5 | − 1 8 30 | −0.9443 | .5567 | +.1759 | +9.6022 | .9621 |
| 25 | B.A.C. 1155 | 7 | +43 | −32 | 18 11.7 | − 1 8 20 | −0.0280 | .5604 | +.1758 | +9.5864 | .9650 |
| 25 | 9 Pleiadum | 8½ | −19 | −66 | 18 21.6 | − 0 58 47 | −1.0720 | .5563 | +.1753 | +9.6048 | .9616 |
| 25 | *d* Pleiadum | 5 | − 1 | −67 | 18 23.4 | − 0 57 1 | −0.8181 | .5573 | +.1751 | +9.6007 | .9624 |
| 25 | 10 Pleiadum | 8 | −24 | −66 | 18 26.2 | − 0 54 20 | −1.1262 | .5562 | +.1750 | +9.6060 | .9614 |
| 25 | 11 Pleiadum | 8½ | −10 | −67 | 18 31.5 | − 0 49 13 | −0.9552 | .5569 | +.1748 | +9.6034 | .9619 |
| 25 | 13 Pleiadum | 8½ | − 1 | −67 | 18 42 1 | − 0 39 0 | −0.8147 | .5577 | +.1743 | +9.6016 | .9622 |
| 25 | 14 Pleiadum | 9 | +13 | −61 | 18 44.6 | − 0 36 36 | −0.5718 | .5587 | +.1743 | +9.5975 | .9630 |
| 25 | 15 Pleiadum | 8½ | − 9 | −67 | 18 47.1 | − 0 34 11 | −0.9378 | .5572 | +.1742 | +9.6039 | .9618 |
| 25 | 16 Pleiadum | 9½ | +11 | −64 | 18 47.6 | − 0 33 43 | −0.6162 | .5586 | +.1742 | +9.5984 | .9628 |
| 25 | 17 Pleiadum | 8 | +16 | −58 | 18 48.2 | − 0 33 10 | −0.5207 | .5590 | +.1741 | +9.5968 | .9631 |
| 25 | 18 Pleiadum | 8 | −10 | −67 | 18 48.3 | − 0 33 5 | −0.9452 | .5593 | +.1740 | +9.6041 | .9618 |
| 25 | *p* Pleiadum | 7½ | − 8 | −67 | 18 49.0 | − 0 32 22 | −0.9196 | .5573 | +.1740 | +9.6036 | .9618 |
| 25 | 19 Pleiadum | 8 | +21 | −53 | 18 49.4 | − 0 32 0 | −0.4256 | .5594 | +.1740 | +9.5952 | .9634 |
| 25 | 22 Pleiadum | 8 | + 5 | −67 | 18 50.7 | − 0 30 45 | −0.7107 | .5582 | +.1740 | +9.6001 | .9625 |
| 25 | 23 Pleiadum | 8½ | +19 | −55 | 18 52.0 | − 0 29 27 | −0.4610 | .5593 | +.1740 | +9.5960 | .9633 |
| 25 | 24 Pleiadum | 8 | −21 | −66 | 18 52.3 | − 0 29 11 | −1.0874 | .5578 | +.1740 | +9.6067 | .9612 |
| 25 | η Tauri | 3 | − 7 | −67 | 18 52.4 | − 0 29 6 | −0.8989 | .5573 | +.1740 | +9.6035 | .9618 |
| 25 | 25 Pleiadum | 8½ | +24 | −50 | 18 56.2 | − 0 25 25 | −0.3790 | .5597 | +.1739 | +9.5948 | .9635 |
| 25 | 26 Pleiadum | 9 | +30 | −45 | 18 58.8 | − 0 22 57 | −0.3034 | .5599 | +.1738 | +9.5937 | .9637 |
| 25 | 27 Pleiadum | 8½ | −19 | −66 | 19 10.8 | − 0 11 24 | −1.0676 | .5568 | +.1734 | +9.6071 | .9612 |
| 25 | 28 Pleiadum | 7 | +37 | −37 | 19 15.0 | − 0 7 17 | −0.1335 | .5606 | +.1732 | +9.5915 | .9641 |
| 25 | 29 Pleiadum | 8 | −20 | −66 | 19 17.7 | − 0 4 43 | −1.0765 | .5568 | +.1732 | +9.6076 | .9611 |
| 25 | *s* Pleiadum | 7½ | +15 | −59 | 19 29.6 | + 0 6 42 | −0.5423 | .5591 | +.1729 | +9.5992 | .9627 |
| 25 | *f* Pleiadum | 4½ | + 4 | −66 | 19 34.8 | + 0 11 46 | −0.7288 | .5584 | +.1728 | +9.6026 | .9620 |
| 25 | *h* Pleiadum | 5½ | − 1 | −67 | 19 35.3 | + 0 12 14 | −0.8128 | .5580 | +.1728 | +9.6041 | .9617 |
| 25 | 30 Pleiadum | 8½ | +14 | −60 | 19 36.1 | + 0 12 58 | −0.5545 | .5591 | +.1728 | +9.5995 | .9626 |
| 25 | 31 Pleiadum | 8 | −20 | −66 | 19 37.3 | + 0 14 9 | −1.0745 | .5571 | +.1727 | +9.6086 | .9609 |
| 25 | 32 Pleiadum | 8 | −18 | −66 | 19 39.4 | + 0 16 10 | −1.0534 | .5571 | +.1727 | +9.6083 | .9610 |
| 25 | 33 Pleiadum | 8½ | − 7 | −66 | 19 41.3 | + 0 18 4 | −0.9107 | .5577 | +.1726 | +9.6060 | .9614 |
| 25 | 34 Pleiadum | 7½ | +26 | −48 | 19 49.5 | + 0 25 52 | −0.3374 | .5603 | +.1723 | +9.5967 | .9632 |
| 25 | 35 Pleiadum | 9 | − 6 | −66 | 19 49.8 | + 0 26 12 | −0.8835 | .5580 | +.1723 | +9.6060 | .9614 |
| 25 | 36 Pleiadum | 9 | − 3 | −66 | 19 53.5 | + 0 29 48 | −0.8455 | .5581 | +.1722 | +9.6055 | .9615 |
| 25 | 37 Pleiadum | 8 | −12 | −66 | 19 54.1 | + 0 30 19 | −0.9826 | .5576 | +.1720 | +9.6078 | .9611 |
| 25 | 38 Pleiadum | 8 | +19 | −55 | 19 55.4 | + 0 31 34 | −0.4620 | 0.5598 | +.1715 | +9.5991 | 9.9627 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| July 25 | B.A.C. 1189 | 7 | +90 | +40 | 19 56.3 | + 0 32 30 | +1.1910 | 0.5665 | +.1710 | +9.5699 | 9.9678 |
| 25 | 39 Pleiadum | 8 | —26 | —66 | 20 7.0 | + 0 42 47 | —1.0950 | .5574 | +.1708 | +9.6103 | .9606 |
| 25 | 40 Pleiadum | 7½ | +16 | —58 | 20 18.0 | + 0 53 22 | —0.5194 | .5598 | +.1705 | +9.6012 | .9623 |
| 25 | 33 Tauri | 6 | +90 | + 7 | 22 53.5 | + 3 23 6 | +0.7106 | .5665 | +.1634 | +9.5875 | .9648 |
| 26 | 36 Tauri | 6½ | +57 | —18 | 1 55.9 | + 6 18 47 | +0.2179 | .5661 | +.1561 | +9.6044 | .9617 |
| 26 | χ Tauri | 5½ | +28 | —43 | 9 25.3 | —10 28 42 | —0.3040 | .5670 | +.1386 | +9.6306 | .9563 |
| 27 | B.A.C. 1648 | 6½ | +21 | —43 | 9 0.1 | —11 48 9 | —0.4128 | .5745 | +.0720 | +9.6689 | .9467 |
| 27 | β Tauri | 2 | —14 | —62 | 11 6.1 | — 9 47 1 | —0.9692 | .5721 | +.0662 | +9.6784 | .9440 |
| 27 | B.A.C. 1746 | 6½ | +58 | — 7 | 14 58.9 | — 6 3 16 | +0.2249 | .5790 | +.0544 | +9.6654 | .9477 |
| 27 | 136 Tauri | 5 | +81 | +10 | 21 55.8 | + 0 37 20 | +0.5297 | .5797 | +.0335 | +9.6655 | .9477 |
| 27 | B.A.C. 1882 | 6½ | — 5 | —61 | 23 10.9 | + 1 49 35 | —0.8324 | .5738 | +.0306 | +9.6844 | .9422 |
| 28 | B.A.C. 2097 | 6½ | +41 | —17 | 12 44.5 | — 9 8 33 | —0.0501 | .5769 | —.0082 | +9.6759 | .9447 |
| 28 | 49 Aurigæ | 5½ | +51 | — 9 | 14 41.6 | — 7 15 58 | +0.1141 | .5772 | —.0112 | +9.6735 | .9454 |
| 28 | 53 Aurigæ | 6½ | —12 | —61 | 15 56.9 | — 6 3 30 | —0.9333 | .5709 | —.0201 | +9.6869 | .9414 |
| 28 | 54 Aurigæ | 6 | +34 | —26 | 16 26.5 | — 4 35 6 | —0.1875 | .5750 | —.0201 | +9.6770 | .9444 |
| 28 | 28 Geminor. | 6 | —17 | —61 | 18 31.6 | — 3 34 49 | —1.0028 | .5700 | —.0260 | +9.6871 | .9413 |
| 29 | 47 Geminor. | 6 | +90 | +16 | 5 26.8 | + 6 55 22 | +0.6736 | .5745 | —.0577 | +9.6584 | .9496 |
| 29 | 53 Geminor. | 6 | +13 | —51 | 7 18.0 | + 8 42 20 | —0.5655 | .5677 | —.0633 | +9.6736 | .9454 |
| Aug. 2 | l Leonis | 5 | +77 | —14 | 11 48.8 | + 9 54 54 | +0.5333 | .5003 | —.2423 | +9.2923 | .9915 |
| 3 | B.A.C. 3837 | 6½ | +38 | —48 | 1 22.6 | — 0 53 53 | —0.1160 | .4917 | —.2481 | +9.1870 | .9948 |
| 3 | σ Leonis | 4 | +90 | +18 | 5 22.2 | + 2 59 11 | +1.1153 | .4912 | —.2531 | +9.0744 | .9969 |
| 4 | 10 Virginis | 6 | —52 | —87 | 8 54.9 | + 5 47 49 | —1.4319 | .4818 | —.2599 | +8.6736 | 9.9995 |
| 4 | 13 Virginis | 6 | +56 | —34 | 14 4.4 | +10 49 11 | +0.2092 | .4817 | —.2600 | +6.3290 | 0.0000 |
| 4 | η Virginis | 3½ | +39 | —50 | 14 47.5 | +11 31 7 | —0.1104 | .4818 | —.2600 | +7.3668 | 0.0000 |
| 5 | B.A.C. 4255 | 6½ | +86 | +23 | 1 35.7 | — 2 57 41 | +1.2023 | .4812 | —.2588 | —8.7957 | 9.9992 |
| 6 | h Virginis | 6 | +35 | —52 | 8 22.5 | + 4 0 9 | —0.1369 | .4875 | —.2467 | —9.2216 | .9939 |
| 6 | 86 Virginis | 6 | +77 | —12 | 15 32.9 | +10 58 48 | +0.6353 | .4891 | —.2420 | —9.3072 | .9909 |
| 7 | Mars |  | + 9 | —83 | 7 23.9 | + 2 23 19 | —0.6008 | .4756 | —.2190 | —9.3828 | .9870 |
| 8 | B.A.C. 4896 | 6 | —32 | —90 | 2 18.8 | — 3 14 49 | —1.1839 | .5137 | —.2072 | —9.4706 | .9802 |
| 8 | ι¹ Libræ | 4½ | —19 | —90 | 12 34.2 | + 6 41 50 | —0.9842 | .5209 | —.1932 | —9.5180 | .9750 |
| 8 | ι² Libræ | 6½ | —41 | —90 | 13 8.9 | + 7 15 29 | —1.2508 | .5229 | —.1918 | —9.5148 | .9754 |
| 9 | 42 Libræ | 5½ | +67 | +16 | 2 2.4 | — 4 15 33 | +1.0290 | .5264 | —.1703 | —9.5981 | .9629 |
| 9 | B.A.C. 5253 | 6 | +66 | 0 | 8 23.2 | + 1 52 42 | +0.7962 | .5317 | —.1591 | —9.6110 | .9604 |
| 9 | B.A.C. 5254 | 6 | +39 | —34 | 8 25.1 | + 1 54 28 | +0.1899 | .5339 | —.1591 | —9.6016 | .9622 |
| 9 | B.A.C. 5286 | 6½ | +66 | 0 | 10 32.5 | + 3 57 44 | +0.8043 | .5333 | —.1553 | —9.6164 | .9593 |
| 9 | B.A.C. 5335 | 6½ | —27 | —90 | 14 0.8 | + 7 19 4 | —1.0238 | .5403 | —.1473 | —9.5957 | .9633 |
| 9 | B.A.C. 5354 | 6½ | —34 | —90 | 15 12.2 | + 8 28 0 | —1.0998 | .5454 | —.1453 | —9.5973 | .9631 |
| 9 | 19 Scorpii | 5½ | —56 | —90 | 20 32.2 | —10 22 59 | —1.2915 | .5497 | —.1346 | —9.6090 | .9608 |
| 9 | σ Scorpii | 3½ | +38 | —83 | 20 44.7 | —10 10 55 | +0.2138 | .5441 | —.1346 | —9.6300 | .9564 |
| 10 | α Scorpii | 1½ | +63 | — 7 | 0 21.5 | — 6 41 37 | +0.6735 | .5459 | —.1258 | —9.6436 | .9532 |
| 10 | 22 Scorpii | 5 | —15 | —90 | 0 44.9 | — 6 19 4 | —0.7854 | .5518 | —.1257 | —9.6227 | .9580 |
| 10 | 25 Scorpii | 6 | —40 | —90 | 7 58.6 | + 0 39 15 | —1.1218 | .5609 | —.1070 | —9.6303 | .9563 |
| 10 | B.A.C. 5800 | 6½ | — 7 | —83 | 19 31.4 | +11 46 47 | —0.5512 | .5669 | —.0790 | —9.6542 | .9506 |
| 10 | A Ophiuchi | 5 | —90 | —36 | 20 2.3 | —11 43 33 | —1.0382 | .5704 | —.0764 | —9.6478 | .9522 |
| 10 | 38 Ophiuchi | 6½ | —35 | —90 | 20 57.6 | —10 50 14 | — 1.0231 | .5712 | —.0736 | —9.6490 | .9519 |
| 10 | 43 Ophiuchi | 6 | +44 | —20 | 23 16.7 | — 8 36 22 | +0.4344 | .5652 | - .0682 | —9.6716 | .9459 |
| 11 | 3 Sagittarii | 5 | + 2 | —67 | 9 10.2 | + 0 54 35 | —0.3457 | .5757 | - .0635 | —9.6684 | .9469 |
| 11 | B.A.C. 6063 | 6½ | + 7 | —55 | 12 50.8 | + 4 26 40 | —0.1849 | .5765 | —.0313 | —9.6722 | .9458 |
| 11 | B.A.C. 6072 | 6½ | +46 | —15 | 13 36.3 | + 5 10 24 | +0.5144 | .5735 | —.0284 | - 9.6819 | .9429 |
| 11 | B.A.C. 6120 | 6½ | +24 | —35 | 16 52.0 | + 8 18 25 | +0.1612 | .5778 | —.0164 | —9.6783 | .9440 |
| 11 | B.A.C. 6127 | 5 | +23 | —36 | 17 23.0 | + 8 48 11 | +0.1512 | .5777 | —.0164 | —9.6782 | .9440 |
| 11 | B.A.C. 6190 | 6½ | +33 | —25 | 21 4.5 | —11 38 56 | +0.3478 | .5787 | —.0043 | —9.6814 | .9431 |
| 11 | B.A.C. 6191 | 6½ | +12 | —45 | 21 4.8 | —11 38 42 | —0.0354 | .5808 | —.0022 | —9.6763 | .9446 |
| 11 | B.A.C. 6220 | 6½ | +21 | —37 | 22 58.3 | — 9 49 39 | +0.1330 | .5808 | +.0004 | - 9.6785 | .9440 |
| 12 | φ Sagittarii | 3½ | —48 | —90 | 8 14.6 | — 0 55 28 | —1.1408 | 0.5901 | +.0295 | —9.6590 | 9.9494 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p'* | *q'* | Log sin *D* | Log. cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Aug. 12 | τ Sagittarii | 3½ | +18 | —46 | 16 32.6 | + 7 2 38 | —0.0219 | 0.5859 | +.0544 | —9.6698 | 9.9465 |
| 12 | B.A.C. 6628 | 6 | +61 | — 5 | 23 22.5 | —10 23 52 | +0.6952 | .5825 | +.0762 | —9.6736 | .9454 |
| 13 | B.A.C. 6666 | 6 | +20 | —46 | 1 29.2 | — 8 22 20 | —0.0227 | .5863 | +.0824 | —9.6611 | .9488 |
| 13 | ω Sagittarii | 5½ | +43 | —24 | 11 38.1 | + 1 22 11 | +0.3596 | .5836 | +.1127 | —9.6522 | .9512 |
| 13 | b Sagittarii | 5 | +62 | +55 | 12 3.3 | + 1 46 23 | —1.2930 | .5784 | +.1158 | —9.6651 | .9477 |
| 13 | A Sagittarii | 5 | +42 | —26 | 12 52.2 | + 2 33 20 | +0.4034 | .5826 | +.1187 | —9.6508 | .9515 |
| 14 | B.A.C. 7077 | 6 | +65 | +19 | 2 17.2 | — 8 33 36 | +1.0605 | .5756 | +.1557 | —9.6228 | .9557 |
| 14 | B.A.C. 7197 | 6 | +24 | —51 | 8 31.4 | — 2 34 2 | —0.1075 | .5789 | +.1717 | —9.5964 | .9632 |
| 14 | B.A.C. 7237 | 6 | +66 | +39 | 10 22.2 | — 0 47 29 | +1.2820 | .5715 | +.1769 | —9.6147 | .9597 |
| 14 | B.A.C. 7335 | 6 | +26 | —51 | 16 43.1 | + 5 18 40 | —0.1110 | .5753 | +.1917 | —9.5692 | .9679 |
| 14 | 27 Capricor. | 6 | — 2 | —90 | 17 7.5 | + 5 42 13 | —0.6723 | .5765 | +.1942 | —9.5569 | .9698 |
| 14 | φ Capricor. | 6 | +29 | —48 | 19 36.8 | + 8 5 47 | —0.0682 | .5735 | +.1987 | —9.5591 | .9694 |
| 14 | 33 Capricor. | 6 | +69 | + 3 | 23 6.8 | +11 27 43 | +0.8580 | .5675 | +.2081 | —9.5632 | .9688 |
| 15 | 37 Capricor. | 6 | +70 | +16 | 3 33.0 | — 8 16 4 | +1.0610 | .5649 | +.2166 | —9.5487 | .9710 |
| 15 | ι Capricor. | 4½ | +69 | — 9 | 4 14.7 | — 7 36 33 | +0.6500 | .5658 | +.2188 | —9.5362 | .9727 |
| 15 | κ Capricor. | 5 | +66 | —14 | 6 48.5 | — 5 7 54 | +0.5766 | .5653 | +.2229 | —9.5239 | .9743 |
| 15 | 29 Aquarii | 6 | +72 | —10 | 15 10.8 | + 2 55 48 | +0.6582 | .5600 | +.2400 | — 9.4817 | .9791 |
| 15 | 45 Aquarii | 6 | —30 | —90 | 22 18.4 | + 9 47 51 | —1.2014 | .5613 | +.2516 | — 9.3842 | .9869 |
| 16 | 50 Aquarii | 6 | +20 | —66 | 0 39.0 | —11 56 34 | —0.3745 | .5585 | +.2547 | —9.3913 | .9864 |
| 16 | 56 Aquarii | 6 | +75 | +89 | 3 10.2 | — 9 30 46 | +1.3268 | .5519 | +.2590 | —9.4219 | .9843 |
| 16 | 70 Aquarii | 6 | +14 | —77 | 11 10.6 | — 1 47 26 | —0.5289 | .5526 | +.2692 | —9.2925 | .9915 |
| 16 | 74 Aquarii | 6 | +78 | +18 | 13 21.8 | + 0 19 12 | +1.1163 | .5484 | +.2715 | —9.3811 | .9898 |
| 16 | λ¹ Aquarii | 6 | —39 | —90 | 18 34.2 | + 5 20 41 | —1.3277 | .5507 | +.2768 | —9.1679 | .9952 |
| 16 | ψ¹ Aquarii | 4½ | +80 | +46 | 23 20.4 | + 9 56 53 | +1.3900 | .5464 | +.2809 | —9.2339 | .9955 |
| 16 | χ Aquarii | 5½ | +52 | —35 | 23 48.2 | +10 23 48 | +0.1744 | .5460 | +.2809 | —9.1699 | .9952 |
| 17 | 20 Piscium | 6 | — 1 | —90 | 13 52.9 | — 0 0 24 | —0.8604 | .5417 | +.2894 | —8.7716 | .9992 |
| 17 | 29 Piscium | 5½ | +86 | +47 | 20 13.7 | + 6 7 37 | +1.4106 | .5390 | +.2909 | —8.8238 | .9990 |
| 18 | 44 Piscium | 6 | +26 | —64 | 7 3.0 | — 7 24 55 | —0.3565 | .5381 | +.2911 | +8.3016 | .9999 |
| 18 | Jupiter |  | +90 | + 3 | 14 9.4 | — 0 32 49 | +0.9282 | .5408 | +.2908 | +8.5290 | .9998 |
| 18 | B.A.C. 221 | 6 | +62 | —29 | 17 32.8 | + 2 43 46 | +0.3090 | .5872 | +.2882 | +8.8990 | .9986 |
| 19 | ι Piscium | 4 | —33 | —83 | 0 16.9 | + 9 24 20 | —1.3107 | .5367 | +.2846 | +9.0931 | .9966 |
| 19 | ζ Piscium | 6 | +66 | —24 | 5 12.5 | —10 0 0 | +0.3825 | .5389 | +.2811 | +9.0744 | .9969 |
| 19 | π Piscium | 5 | —29 | —79 | 15 49.6 | + 0 15 39 | —1.2566 | .5383 | +.2725 | +9.2962 | .9913 |
| 20 | 27 Arietis | 6 | + 3 | —68 | 15 47.7 | — 0 35 59 | —0.7813 | .5456 | +.2407 | +9.4676 | .9804 |
| 20 | 40 Arietis | 6 | +69 | —22 | 23 29.1 | + 6 49 21 | +0.4052 | .5528 | +.2269 | +9.4826 | .9790 |
| 20 | π Arietis | 5½ | +90 | +42 | 23 49.9 | + 7 9 22 | +1.2912 | .5542 | +.2269 | +9.4626 | .9809 |
| 21 | ϱ² Arietis | 6 | +90 | +19 | 2 38.3 | + 9 51 48 | +1.0186 | .5547 | +.2214 | +9.4841 | .9788 |
| 21 | 47 Arietis | 6 | —22 | —70 | 3 33.7 | +10 45 11 | —1.1384 | .5495 | +.2195 | +9.5359 | .9728 |
| 21 | δ Arietis | 4½ | +90 | +22 | 9 23.9 | — 7 37 11 | +1.0292 | .5603 | +.2075 | +9.5167 | .9752 |
| 21 | ζ Arietis | 4½ | +43 | —36 | 10 46.9 | — 6 16 11 | —0.0362 | .5551 | +.2055 | +9.5446 | .9715 |
| 21 | B.A.C. 1082 | 6½ | +90 | +22 | 13 19.5 | — 3 50 9 | +1.0093 | .5614 | +.1991 | +9.5338 | .9730 |
| 21 | τ¹ Arietis | 5 | +68 | —14 | 13 28.0 | — 3 41 59 | +0.3864 | .5591 | +.1991 | +9.5469 | .9712 |
| 21 | τ² Arietis | 6 | +90 | +16 | 14 7.7 | — 3 3 39 | +0.9255 | .5617 | +.1968 | +9.5388 | .9723 |
| 21 | 65 Arietis | 6 | +90 | +21 | 14 50.1 | — 2 22 52 | +0.9977 | .5618 | +.1968 | +9.5401 | .9722 |
| 21 | 66 Arietis | 6½ | + 4 | —68 | 16 29.3 | — 0 48 13 | —0.7355 | .5563 | +.1925 | +9.5794 | .9662 |
| 21 | 9 Tauri | 6 | +18 | —58 | 20 4.2 | + 2 39 43 | —0.4970 | .5591 | +.1835 | +9.5871 | .9649 |
| 21 | g Pleiadum | 5½ | —16 | —66 | 23 19.5 | + 5 46 50 | —1.0363 | .5580 | +.1766 | +9.6065 | .9613 |
| 21 | b Pleiadum | 5½ | — 3 | —67 | 23 21.5 | + 5 49 47 | —0.8505 | .5587 | +.1766 | +9.6035 | .9618 |
| 21 | ι Tauri | 5 | —30 | —66 | 23 29.3 | + 5 57 18 | —1.1901 | .5573 | +.1766 | +9.6096 | .9607 |
| 21 | 1 Pleiadum | 6 | + 4 | —66 | 23 35.6 | + 6 3 23 | —0.7303 | .5591 | +.1766 | +9.6021 | .9621 |
| 21 | 2 Pleiadum | 8½ | —27 | —66 | 23 38.5 | + 6 6 9 | —1.1604 | .5574 | +.1765 | +9.6095 | .9607 |
| 21 | 3 Pleiadum | 9 | + 2 | —67 | 23 39.5 | + 6 7 6 | —0.7688 | .5591 | +.1765 | +9.6030 | .9620 |
| 21 | 4 Pleiadum | 8 | —15 | —66 | 23 40.1 | + 6 7 39 | —1.0254 | .5580 | +.1763 | +9.6073 | .9611 |
| 21 | 5 Pleiadum | 9 | —52 | —66 | 23 40.4 | + 6 7 57 | —1.3222 | .5567 | +.1763 | +9.6128 | .9601 |
| 21 | 6 Pleiadum | 9 | —11 | —66 | 23 41.6 | + 6 9 10 | —0.9730 | 0.5582 | +.1763 | +9.6066 | 9.9613 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Aug. 21 | *c* Pleiadum | 5 | —17 | —66 | 23 44.9 | + 6 12 20 | —1.0440 | 0.5580 | +.1760 | +9.6079 | 9.9610 |
| 21 | 7 Pleiadum | 8 | + 6 | —67 | 23 46.2 | + 6 13 36 | —0.7045 | .5594 | +.1760 | +9.6022 | .9621 |
| 21 | B.A.C. 1155 | 7 | +57 | —20 | 23 46.5 | + 6 13 54 | +0 2089 | .5631 | +.1759 | +9.5865 | .9650 |
| 21 | *k* Pleiadum | 7½ | —35 | —66 | 23 46.7 | + 6 14 5 | —1.2306 | .5572 | +.1759 | +9.6111 | .9604 |
| 21 | *l* Pleiadum | 7 | —30 | —66 | 23 50.2 | + 6 17 27 | —1.1932 | .5573 | +.1758 | +9.6106 | .9604 |
| 21 | 9 Pleiadum | 8½ | — 2 | —67 | 23 56.2 | + 6 23 13 | —0.8306 | .5590 | +.1754 | +9.6048 | .9616 |
| 22 | *d* Pleiadum | 5 | +13 | —62 | 23 58.1 | + 6 25 0 | —0.5785 | .5600 | +.1753 | +9.6007 | .9624 |
| 22 | 10 Pleiadum | 8 | — 5 | —66 | 0 1.1 | + 6 27 58 | —0.8841 | .5587 | +.1750 | +9.6060 | .9614 |
| 22 | 11 Pleiadum | 8½ | + 5 | —67 | 0 6.4 | + 6 32 1 | —0.7140 | .5596 | +.1746 | +9.6034 | .9619 |
| 22 | 12 Pleiadum | 7½ | —23 | —66 | 0 14.2 | + 6 40 29 | —1.1189 | .5581 | +.1742 | +9.6105 | .9605 |
| 22 | 13 Pleiadum | 8½ | + 3 | —66 | 0 16.6 | + 6 42 50 | —0.7456 | .5602 | +.1742 | +9.6019 | .9622 |
| 22 | 14 Pleiadum | 9 | +26 | —48 | 0 19.1 | + 6 55 14 | —0.3337 | .5613 | +.1742 | +9.5975 | .9630 |
| 22 | 15 Pleiadum | 8½ | + 6 | —66 | 0 21.6 | + 6 47 38 | —0.6973 | .5598 | +.1742 | +9.6039 | .9618 |
| 22 | 16 Pleiadum | 9½ | +24 | —50 | 0 22.0 | + 6 48 6 | —0 3777 | .5610 | +.1742 | +9.5984 | .9628 |
| 22 | 17 Pleiadum | 8 | +29 | —45 | 0 22.6 | + 6 48 37 | —0.2828 | .5616 | +.1742 | +9.5966 | .9632 |
| 22 | 18 Pleiadum | 8 | + 6 | —66 | 0 22.7 | + 6 48 43 | —0.7050 | .5596 | +.1742 | +9.6041 | .9617 |
| 22 | *p* Pleiadum | 7½ | + 7 | —66 | 0 23.4 | + 6 49 20 | —0.6797 | .5598 | +.1742 | +9.6036 | .9618 |
| 22 | 19 Pleiadum | 8 | +34 | —40 | 0 23.8 | + 6 49 47 | —0.1879 | .5618 | +.1742 | +9.5952 | .9634 |
| 22 | 20 Pleiadum | 8 | —27 | —66 | 0 24.0 | + 6 50 1 | —1.1617 | .5577 | +.1742 | +9.6118 | .9602 |
| 22 | 21 Pleiadum | 8½ | —35 | —66 | 0 25.1 | + 6 51 0 | —1.2286 | .5574 | +.1742 | +9.6129 | .9600 |
| 22 | 22 Pleiadum | 8 | +19 | —55 | 0 25.1 | + 6 51 1 | —0.4716 | .5607 | +.1742 | +9.6002 | .9625 |
| 22 | 23 Pleiadum | 8½ | +32 | —42 | 0 26.5 | + 6 52 20 | —0.2235 | .5617 | +.1742 | +9.5960 | .9633 |
| 22 | 24 Pleiadum | 8 | — 3 | —66 | 0 26.7 | + 6 52 35 | —0.8470 | .5590 | +.1742 | +9.6067 | .9612 |
| 22 | *η* Tauri | 3 | + 8 | —65 | 0 26.8 | + 6 52 39 | —0.6587 | .5598 | +.1742 | +9.6035 | .9618 |
| 22 | 25 Pleiadum | 8½ | +37 | —38 | 0 30.6 | + 6 56 17 | —0.1419 | .5627 | +.1742 | +9.5948 | .9635 |
| 22 | 26 Pleiadum | 9 | +41 | —34 | 0 33.1 | + 6 58 45 | —0.0662 | .5626 | +.1742 | +9.5937 | .9637 |
| 22 | 27 Pleiadum | 8½ | — 2 | —66 | 0 45.0 | + 7 10 14 | —0.8270 | .5596 | +.1740 | +9.6071 | .9612 |
| 22 | 28 Pleiadum | 7 | +50 | —25 | 0 48.9 | + 7 13 56 | +0 1021 | .5635 | +.1740 | +9.5915 | .9641 |
| 22 | 29 Pleiadum | 8 | — 2 | —66 | 0 51.9 | + 7 16 50 | —0.8356 | .5596 | +.1740 | +9.6076 | .9611 |
| 22 | *s* Pleiadum | 7½ | +28 | —46 | 1 3.6 | + 7 28 8 | —0.3042 | .5618 | +.1735 | +9.5992 | .9627 |
| 22 | *f* Pleiadum | 4½ | +18 | —56 | 1 8.8 | + 7 33 8 | —0.4897 | .5610 | +.1730 | +9.6026 | .9620 |
| 22 | *h* Pleiadum | 5½ | +13 | —61 | 1 9.3 | + 7 33 37 | —0.5736 | .5607 | +.1730 | +9.6041 | .9617 |
| 22 | 30 Pleiadum | 8½ | +27 | —47 | 1 10.1 | + 7 34 20 | —0.3162 | .5618 | +.1728 | +9.5997 | .9626 |
| 22 | 31 Pleiadum | 8 | — 2 | —66 | 1 11.3 | + 7 35 31 | —0.8339 | .5596 | +.1727 | +9.6086 | .9609 |
| 22 | 32 Pleiadum | 8 | — 1 | —66 | 1 13.4 | + 7 37 31 | —0.8128 | .5599 | +.1725 | +9.6083 | .9610 |
| 22 | 33 Pleiadum | 8½ | + 8 | —66 | 1 15.3 | + 7 39 23 | —0.6713 | .5604 | +.1719 | +9.6060 | .9614 |
| 22 | 34 Pleiadum | 7½ | +39 | —35 | 1 23.4 | + 7 47 7 | —0.1007 | .5629 | +.1718 | +9.5967 | .9632 |
| 22 | 35 Pleiadum | 9 | + 9 | —64 | 1 23.7 | + 7 47 26 | —0.6443 | .5605 | +.1718 | +9.6060 | .9614 |
| 22 | 36 Pleiadum | 9 | +11 | —63 | 1 27.4 | + 7 51 0 | —0.6062 | .5608 | +.1718 | +9.6055 | .9615 |
| 22 | 37 Pleiadum | 8 | + 2 | —64 | 1 27.9 | + 7 51 31 | —0.7572 | .5601 | +.1718 | +9.6078 | .9610 |
| 22 | 38 Pleiadum | 8 | +32 | —42 | 1 29.2 | + 7 52 46 | —0.2247 | .5625 | +.1718 | +9.5991 | .9627 |
| 22 | 39 Pleiadum | 8 | — 4 | —66 | 1 40.8 | + 8 3 52 | —0.8545 | .5599 | +.1718 | +9.6103 | .9606 |
| 22 | 40 Pleiadum | 8 | +29 | —45 | 1 51.8 | + 8 14 21 | —0.2783 | .5619 | +.1718 | +9.6011 | .9623 |
| 22 | 33 Tauri | 6 | +90 | +21 | 4 27.1 | +10 43 59 | +0.9432 | .5683 | +.1645 | +9.5875 | .9648 |
| 22 | 36 Tauri | 6½ | +73 | — 6 | 7 26.9 | —10 22 54 | +0.4482 | .5677 | +.1571 | +9.6043 | .9617 |
| 22 | *χ* Tauri | 5½ | +40 | —31 | 14 53.7 | — 3 12 56 | —0.0804 | .5678 | +.1364 | +9.6306 | .9563 |
| 23 | B.A.C. 1648 | 6½ | +32 | —31 | 14 27.3 | — 4 33 36 | —0.2207 | .5733 | +.0720 | +9.6690 | .9467 |
| 23 | *β* Tauri | 2 | 0 | —62 | 16 33.7 | — 2 32 5 | —0.7713 | .5707 | +.0661 | +9.6784 | .9440 |
| 23 | B.A.C. 1746 | 6½ | +71 | + 1 | 20 27.4 | + 1 12 25 | +0.4185 | .5770 | +.0543 | +9.6654 | .9477 |
| 23 | B.A.C. 1772 | 6 | —31 | —61 | 21 46.0 | + 2 28 6 | —1.1482 | .5690 | +.0514 | +9.6873 | .9413 |
| 24 | 136 Tauri | 5 | +90 | +20 | 3 26.5 | + 7 55 22 | +0.7166 | .5786 | +.0336 | +9.6655 | .9477 |
| 24 | B.A.C. 1882 | 6½ | + 5 | —58 | 4 42.1 | + 9 8 3 | —0.6860 | .5712 | +.0306 | +9.6849 | .9420 |
| 24 | *κ* Aurigæ | 4 | —36 | —61 | 12 16.0 | — 7 35 34 | —1.1790 | .5675 | + 0072 | +9.6930 | .9395 |
| 24 | B.A.C. 2097 | 6½ | +52 | — 9 | 18 21.5 | — 1 44 5 | +0.1200 | .5731 | —.0108 | +9.6759 | .9447 |
| 24 | 49 Aurigæ | 5½ | +62 | — 2 | 20 20.2 | + 0 9 59 | +0.2763 | 0.5733 | —.0166 | +9.6735 | 9.9454 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | H | Y | p′ | q′ | Log sin D | Log. cos D |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Aug. 24 | 53 Aurigæ | 6½ | — 1 | —61 | 21 36.2 | + 1 23 10 | —0.7773 | 0.5677 | —0196 | +9.6870 | 9 9414 |
| 24 | 54 Aurigæ | 6 | +43 | —18 | 22 6.1 | + 1 51 50 | —0.0282 | .5709 | —.0224 | +9.6770 | .9444 |
| 25 | 28 Geminor. | 6 | — 5 | —61 | 0 12.4 | + 3 53 21 | —0.8461 | .5662 | —.0282 | +9.6870 | .9414 |
| 25 | 47 Geminor. | 6 | +90 | +23 | 11 14.8 | — 9 29 15 | +0.8164 | .5696 | —.0593 | +9.6584 | .9496 |
| 25 | 53 Geminor. | 6 | +21 | —43 | 13 7.2 | — 7 41 0 | —0.4199 | .5630 | —.0648 | +9.6736 | .9454 |
| 25 | 59 Geminor. | 6½ | +21 | —43 | 16 43.9 | — 4 12 21 | —0.4228 | .5618 | —.0729 | +9.6703 | .9463 |
| 25 | ι Geminor. | 4 | + 8 | —58 | 17 14.3 | — 3 43 4 | —0.6398 | .5598 | —.0774 | +9.6728 | .9456 |
| 25 | $b^1$ Geminor. | 5½ | —27 | —62 | 18 44.2 | — 2 16 28 | —1.1099 | .5572 | —.0789 | +9.6774 | .9442 |
| 25 | $b^2$ Geminor. | 5½ | — 9 | —62 | 18 56.6 | — 2 4 32 | —0.9109 | .5573 | —.0809 | +9.6746 | .9451 |
| 25 | B.A.C. 2472 | 6 | —12 | —62 | 19 18.2 | — 1 43 49 | —0.9421 | .5576 | —.0809 | +9.6746 | .9451 |
| 25 | υ Geminor. | 5 | +42 | —25 | 21 33.7 | + 0 26 44 | —0.0647 | .5605 | —.0863 | +9.6602 | .9490 |
| 26 | c Geminor. | 6 | +90 | +17 | 1 5.2 | + 3 50 30 | +0.7771 | .5617 | —.0966 | +9.6438 | .9532 |
| 26 | φ Geminor. | 5 | + 4 | —63 | 5 5.9 | + 7 42 35 | —0.7099 | .5525 | —.1066 | +9.6590 | .9494 |
| 26 | $\omega^1$ Cancri | 6 | +68 | — 6 | 8 21.7 | +10 51 21 | +0.3792 | .5555 | —.1142 | +9.6385 | .9545 |
| 26 | $\omega^2$ Cancri | 6½ | +90 | + 9 | 8 43.2 | +11 12 7 | +0.6627 | .5569 | —.1143 | +9.6337 | .9555 |
| 26 | $\psi^1$ Cancri | 5½ | +10 | —60 | 12 25.4 | — 9 13 37 | —0.6200 | .5485 | —.1235 | +9.6460 | .9527 |
| 26 | $\psi^2$ Cancri | 4 | +29 | —41 | 12 32.3 | — 9 6 53 | —0.2868 | .5500 | —.1235 | +9.6410 | .9538 |
| 26 | λ Cancri | 6 | +90 | +10 | 17 2.5 | — 4 46 8 | +0.7129 | .5546 | —.1350 | +9.6173 | .9591 |
| 26 | $\upsilon^1$ Cancri | 7 | +31 | —39 | 19 46.6 | — 2 7 43 | —0.2334 | .5456 | —.1394 | +9.6259 | .9573 |
| 26 | $\upsilon^2$ Cancri | 6½ | +48 | —25 | 20 39.8 | — 1 16 21 | +0.0554 | .5460 | —.1417 | +9.6197 | .9586 |
| 26 | B.A.C. 2840 | 7 | +35 | —40 | 21 8.2 | — 0 48 59 | —0.2288 | .5436 | —.1437 | +9.6230 | .9579 |
| 26 | $\upsilon^3$ Cancri | 6 | +41 | —32 | 21 58.6 | — 0 0 16 | —0.0731 | .5435 | —.1459 | +9.6188 | .9588 |
| 26 | 32 Cancri | 7 | +34 | —37 | 22 39.1 | + 0 38 48 | —0.1806 | .5436 | —.1460 | +9.6189 | .9588 |
| 27 | ξ Cancri | 5 | — 3 | —68 | 15 34.4 | — 6 59 42 | —0.8467 | .5287 | —.1794 | +9.5851 | .9652 |
| 27 | 79 Cancri | 6 | — 5 | —68 | 16 2.7 | — 6 32 17 | —0.8806 | .5272 | —.1810 | +9.5843 | .9654 |
| 27 | B.A.C. 3138 | 6 | +23 | —54 | 17 37.5 | — 5 0 34 | —0.4051 | .5288 | —.1829 | +9.5712 | 9.9676 |
| 31 | 13 Virginis | 6 | +48 | —42 | 21 4.6 | — 4 23 2 | +0.0629 | .4825 | —.2650 | +6.3190 | 0.0000 |
| 31 | η Virginis | 3½ | +32 | —59 | 21 47.6 | — 3 41 5 | —0.2581 | .4825 | —.2650 | +7.3632 | 0.0000 |
| Sept. 1 | B.A.C. 4255 | 6½ | +87 | +12 | 8 36.4 | + 6 50 37 | +1.0409 | .4828 | —.2605 | —8.7956 | 9.9992 |
| 2 | h Virginis | 6 | +25 | —64 | 15 26.0 | —11 8 43 | —0.3359 | .4879 | —.2477 | —9.2140 | .9941 |
| 2 | 86 Virginis | 6 | +65 | —22 | 22 37.8 | — 4 8 37 | +0.4334 | .4892 | —.2429 | —9.3072 | .9909 |
| 3 | B.A.C. 4679 | 6½ | +76 | + 2 | 8 45.5 | + 5 42 18 | +0.8716 | .4920 | —.2346 | —9.3720 | .9864 |
| 4 | $\iota^1$ Libræ | 4½ | —37 | —90 | 20 2.2 | — 8 2 34 | —1.2162 | .5192 | —.1914 | —9.5179 | .9750 |
| 4 | B A.C. 5023 | 6 | +68 | +39 | 22 2.7 | — 6 5 46 | +1.2835 | .5129 | —.1883 | —9.5711 | .9676 |
| 5 | 42 Libræ | 5½ | +67 | + 1 | 9 39.6 | + 5 9 22 | +0.8226 | .5217 | —.1730 | —9.5981 | .9629 |
| 5 | B.A.C. 5253 | 6 | +66 | — 1 | 16 6.7 | +11 23 57 | +0.7716 | .5282 | —.1571 | —9.6110 | .9604 |
| 5 | B.A.C. 5254 | 6 | +29 | —46 | 16 8.6 | +11 26 46 | —0.0211 | .5304 | —.1571 | —9.6016 | .9622 |
| 5 | 3 Scorpii | 6 | +66 | +52 | 16 27.0 | +11 43 39 | +1.3173 | .5250 | —.1571 | —9.6230 | .9579 |
| 5 | B.A.C. 5286 | 6½ | +61 | —12 | 18 18.1 | —10 28 58 | +0.5991 | .5294 | —.1536 | —9.6164 | .9593 |
| 6 | σ Scorpii | 3½ | +27 | —44 | 4 41.4 | — 0 26 26 | +0.0076 | .5412 | —.1334 | —9.6299 | .9564 |
| 6 | α Scorpii | 1½ | +51 | —18 | 8 22.5 | + 3 7 7 | +0.4740 | .5405 | —.1241 | —9.6436 | .9532 |
| 6 | 22 Scorpii | 5 | —28 | —90 | 8 46.3 | + 3 30 7 | —0.9993 | .5464 | —.1241 | —9.6227 | .9580 |
| 7 | B.A.C. 5800 | 6½ | —18 | —90 | 3 57.3 | — 1 59 32 | —0.7515 | .5610 | —.0759 | —9.6542 | .9506 |
| 7 | A Ophiuchi | 5 | —55 | —90 | 4 28.8 | — 1 29 12 | —1.2419 | .5629 | —.0759 | —9.6478 | .9522 |
| 7 | 38 Ophiuchi | 6½ | —53 | —90 | 5 25.4 | — 0 34 35 | —1.2266 | .5635 | —.0733 | —9.6490 | .9519 |
| 7 | 43 Ophiuchi | 6 | +33 | —31 | 7 47.8 | + 1 42 32 | +0.2488 | .5576 | —.0681 | —9.6716 | .9459 |
| 7 | 3 Sagittarii | 5 | —10 | —82 | 17 55.5 | +11 27 44 | —0.5314 | .5688 | —.0381 | —9.6684 | .9469 |
| 7 | B.A.C. 6063 | 6½ | — 2 | —68 | 21 41.5 | — 8 54 45 | —0.3732 | .5691 | —.0296 | —9.6722 | .9458 |
| 7 | B.A.C. 6072 | 6½ | +35 | —25 | 22 28.1 | — 8 9 56 | +0.3434 | .5662 | —.0268 | —9.6819 | .9429 |
| 8 | $\gamma^1$ Sagittarii | 4 | +61 | +35 | 1 3.4 | — 5 40 30 | +1.1811 | .5632 | —.0182 | —9.6935 | .9393 |
| 8 | B.A.C. 6120 | 6½ | +15 | —45 | 1 48.6 | — 4 57 5 | —0.0112 | .5692 | —.0182 | —9.6782 | .9440 |
| 8 | B.A.C. 6127 | 5 | +14 | —46 | 2 20.3 | — 4 26 34 | —0.0209 | .5699 | —.0153 | —9.6782 | .9440 |
| 8 | B.A.C. 6190 | 6½ | +34 | —24 | 6 7.3 | — 0 48 2 | +0.3569 | .5707 | —.0036 | —9.6814 | .9431 |
| 8 | B.A.C. 6191 | 6½ | + 4 | —57 | 6 7.6 | — 0 47 56 | —0.2065 | .5727 | —.0036 | —9.6763 | .9446 |
| 8 | B.A.C. 6220 | 6½ | +12 | —47 | 7 59.9 | + 1 0 2 | —0.0351 | 0.5725 | —.0023 | —9.6787 | 9.9439 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | | At Washington Mean Time of Conjunction. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Northern. | Southern. | | | *H* | | | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | | ° | ° | h. | m. | h. | m. | s. | | | | | |
| Sept. | 9 | τ Sagittarii | 3½ | +10 | —55 | 2 | 3.9 | — 5 | 38 | 1 | —0.1713 | 0.5781 | +.0562 | —9.6698 | 9.9464 |
| | 9 | B.A.C. 6628 | 6 | +52 | —13 | 9 | 3.5 | + 1 | 5 | 5 | +0.5611 | .5749 | +.0773 | —9.6736 | .9454 |
| | 9 | B.A.C. 6666 | 6 | +13 | —54 | 11 | 13.0 | + 3 | 9 | 31 | —0.1604 | .5786 | +.0832 | —9.6611 | .9488 |
| | 9 | ω Sagittarii | 5½ | +28 | —41 | 21 | 35.0 | —10 | 52 | 49 | +0.0670 | .5748 | +.1127 | —9.6528 | .9511 |
| | 9 | *b* Sagittarii | 5 | +63 | +32 | 22 | 1.1 | —10 | 27 | 41 | +1.1814 | .5712 | +.1157 | —9.6651 | .9477 |
| | 9 | A Sagittarii | 5 | +39 | —29 | 22 | 50.6 | — 9 | 40 | 7 | +0.2838 | .5760 | +.1156 | —9.6508 | .9515 |
| | 10 | B.A.C. 7077 | 6 | +65 | +12 | 12 | 30.7 | + 8 | 28 | 2 | +0.9636 | .5738 | +.1549 | —9.6328 | .9558 |
| | 10 | B.A.C. 7197 | 6 | +20 | —56 | 18 | 50.6 | + 9 | 33 | 21 | —0.2032 | .5737 | +.1707 | —9.5964 | .9632 |
| | 10 | B.A.C. 7237 | 6 | +66 | +31 | 20 | 43.2 | +11 | 21 | 38 | +1.1965 | .5669 | +.1758 | —9.6147 | .9597 |
| | 11 | B.A.C. 7335 | 6 | +22 | —56 | 3 | 8.9 | — 6 | 27 | 22 | —0.1928 | .5699 | +.1932 | —9.5692 | .9679 |
| | 11 | 27 Capricor. | 6 | — 7 | —90 | 3 | 33.7 | — 6 | 3 | 31 | —0.7560 | .5723 | +.1932 | —9.5569 | .9698 |
| | 11 | φ Capricor. | 6 | +25 | —53 | 6 | 4.6 | — 3 | 38 | 16 | —0.1455 | .5688 | +.2003 | —9.5591 | .9695 |
| | 11 | 33 Capricor. | 6 | +69 | — 1 | 9 | 36.7 | — 0 | 14 | 12 | +0.7893 | .5642 | +.2071 | —9.5632 | .9688 |
| | 11 | 37 Capricor. | 6 | +70 | +12 | 14 | 5.2 | + 4 | 4 | 16 | +0.9993 | .5612 | +.2180 | —9.5487 | .9710 |
| | 11 | ε Capricor. | 4½ | +66 | —13 | 15 | 1.6 | + 4 | 58 | 36 | +0.5889 | .5623 | +.2202 | —9.5362 | .9727 |
| | 11 | κ Capricor. | 5 | +63 | —17 | 17 | 22.1 | + 7 | 13 | 53 | +0.5199 | .5621 | +.2244 | —9.5239 | .9743 |
| | 12 | 29 Aquarii | 6 | +70 | —12 | 1 | 46.7 | — 8 | 40 | 7 | +0.6173 | .5587 | +.2399 | —9.4817 | .9791 |
| | 12 | 45 Aquarii | 6 | —33 | —90 | 8 | 54.7 | — 1 | 47 | 36 | —1.2300 | .5604 | +.2539 | —9.3848 | .9869 |
| | 12 | 50 Aquarii | 6 | +19 | —68 | 11 | 15.3 | + 0 | 27 | 56 | —0.3995 | .5576 | +.2569 | —9.3913 | .9864 |
| | 12 | 56 Aquarii | 6 | +75 | +35 | 13 | 46.3 | + 2 | 53 | 26 | +1.3020 | .5525 | +.2598 | —9.4219 | .9843 |
| | 12 | 70 Aquarii | 6 | +14 | —77 | 21 | 44.6 | +10 | 34 | 42 | —0.5340 | .5540 | +.2709 | —9.2924 | .9915 |
| | 12 | 74 Aquarii | 6 | +78 | +17 | 23 | 54.9 | —11 | 19 | 32 | +1.1089 | .5494 | +.2746 | —9.3310 | .9898 |
| | 13 | *h*¹ Aquarii | 6 | —36 | —90 | 5 | 4.8 | — 6 | 20 | 36 | —1.3116 | .5522 | +.2800 | —9.1680 | .9952 |
| | 13 | χ Aquarii | 5½ | +53 | —35 | 10 | 15.5 | — 1 | 20 | 45 | +0.1910 | .5484 | +.2847 | —9.1699 | .9952 |
| | 14 | 20 Piscium | 6 | + 2 | —90 | 0 | 7.7 | —11 | 57 | 27 | —0.8091 | .5464 | +.2936 | —8.7717 | .9992 |
| | 14 | 44 Piscium | 6 | +81 | —59 | 16 | 56.2 | + 4 | 16 | 23 | —0.2690 | .5447 | +.2968 | +8.2975 | 9.9999 |
| | 14 | JUPITER | | +90 | — 3 | 19 | 21.1 | + 6 | 36 | 12 | +0.8110 | .5503 | +.2984 | +8.1293 | 0 0000 |
| | 15 | B.A.C. 221 | 6 | +16 | —79 | 3 | 9.8 | — 9 | 51 | 10 | —0.5746 | .5447 | +.3004 | +8.8979 | 9.9986 |
| | 15 | ε Piscium | 4 | —23 | —83 | 9 | 42.1 | — 3 | 32 | 29 | —1.1940 | .5437 | +.2908 | +9.0932 | .9966 |
| | 15 | ζ Piscium | 6 | +73 | —19 | 14 | 29.3 | + 1 | 4 | 49 | +0.4799 | .5468 | +.2867 | +9.0744 | .9969 |
| | 16 | π Piscium | 5 | —18 | —79 | 0 | 46.6 | +11 | 0 | 34 | —1.1205 | .5603 | +.2783 | +9.2962 | .9913 |
| | 16 | 27 Arietis | 6 | +11 | —71 | 23 | 56.6 | + 9 | 20 | 53 | —0.6310 | .5565 | +.2442 | +9.4676 | .9804 |
| | 17 | 40 Arietis | 6 | +78 | —10 | 7 | 22.5 | — 7 | 29 | 32 | +0.5248 | .5631 | +.2314 | +9.4826 | .9790 |
| | 17 | ρ³ Arietis | 6 | +90 | +30 | 10 | 25.4 | — 4 | 33 | 25 | +1.1598 | .5664 | +.2254 | +9.4841 | .9788 |
| | 17 | 47 Arietis | 6 | —10 | —70 | 11 | 18.9 | — 3 | 41 | 51 | —0.9763 | .5598 | +.2234 | +9.5360 | .9728 |
| | 17 | δ Arietis | 4½ | +90 | +32 | 16 | 57.6 | + 1 | 44 | 13 | +1.1612 | .5703 | +.2106 | +9.5167 | .9752 |
| | 17 | ζ Arietis | 4½ | +51 | —28 | 18 | 17.9 | + 3 | 1 | 28 | +0.1115 | .5665 | +.2084 | +9.5445 | .9715 |
| | 17 | τ¹ Arietis | 5 | +79 | — 6 | 20 | 58.8 | + 5 | 31 | 28 | +0.5289 | .5696 | +.2015 | +9.5469 | .9713 |
| | 17 | τ² Arietis | 6 | +90 | +25 | 21 | 32.2 | + 6 | 8 | 30 | +1.0602 | .5711 | +.2016 | +9.5387 | .9723 |
| | 17 | 65 Arietis | 6 | +90 | +31 | 22 | 13.2 | + 6 | 47 | 55 | +1.1314 | .5725 | +.1993 | +9.5401 | .9722 |
| | 17 | 66 Arietis | 6½ | +14 | —63 | 23 | 49.3 | + 8 | 20 | 24 | —0.5750 | .5657 | +.1969 | +9.5794 | .9662 |
| | 18 | 9 Tauri | 6 | +26 | —49 | 3 | 17.4 | +11 | 40 | 34 | —0.3394 | .5682 | +.1872 | +9.5871 | .9649 |
| | 18 | *g* Pleiadum | 5½ | — 4 | —66 | 6 | 26.1 | — 9 | 17 | 58 | —0.8726 | .5673 | +.1799 | +9.6065 | .9613 |
| | 18 | *b* Pleiadum | 5½ | + 7 | —66 | 6 | 28.6 | — 9 | 15 | 29 | —0.6873 | .5679 | +.1799 | +9.6035 | .9618 |
| | 18 | ε Tauri | 5 | —15 | —66 | 6 | 36.2 | — 9 | 8 | 13 | —1.0221 | .5666 | +.1799 | +9.6096 | .9607 |
| | 18 | 1 Pleiadum | 8 | +14 | —61 | 6 | 42.5 | — 9 | 2 | 8 | —0.5694 | .5688 | +.1787 | +9.6021 | .9621 |
| | 18 | 2 Pleiadum | 8½ | —13 | —66 | 6 | 45.0 | — 8 | 59 | 41 | —0.9933 | .5666 | +.1786 | +9.6096 | .9607 |
| | 18 | 3 Pleiadum | 9 | +11 | —61 | 6 | 46.0 | — 8 | 58 | 44 | —0.6071 | .5683 | +.1786 | +9.6030 | .9620 |
| | 18 | 4 Pleiadum | 8 | — 4 | —66 | 6 | 46.6 | — 8 | 58 | 12 | —0.8606 | .5671 | +.1786 | +9.6073 | .9611 |
| | 18 | 5 Pleiadum | 9 | —26 | —65 | 6 | 47.2 | — 8 | 57 | 40 | —1.1529 | .5658 | +.1786 | +9.6123 | .9601 |
| | 18 | 6 Pleiadum | 9 | 0 | —66 | 6 | 48.1 | — 8 | 56 | 43 | —0.8081 | .5674 | +.1785 | +9.6066 | .9613 |
| | 18 | *c* Pleiadum | 5 | — 5 | —66 | 6 | 51.3 | — 8 | 53 | 39 | —0.8786 | .5670 | +.1784 | +9.6079 | .9610 |
| | 18 | 7 Pleiadum | 8 | +15 | —60 | 6 | 52.6 | — 8 | 52 | 26 | —0.5437 | .5692 | +.1784 | +9.6022 | .9621 |
| | 18 | B.A.C. 1155 | 7 | +66 | —13 | 6 | 52.8 | — 8 | 52 | 16 | +0.3563 | .5731 | +.1784 | +9.5865 | .9650 |
| | 18 | *k* Pleiadum | 7½ | —18 | —66 | 6 | 53.1 | — 8 | 51 | 59 | —1.0624 | 0.5670 | +.1784 | +9.6111 | 9.9604 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log. cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Sept. 18 | *l* Pleiadum | 7 | —15 | —65 | 6 56.5 | — 8 48 41 | —1.0254 | 0.5671 | +.1783 | +9.6106 | 9.9604 |
| 18 | 9 Pleiadum | 8½ | + 8 | —66 | 7 2.3 | — 8 43 7 | —0.6683 | .5687 | +.1780 | +9.6048 | .9616 |
| 18 | *d* Pleiadum | 5 | +22 | —53 | 7 4.1 | — 8 41 24 | —0.4194 | .5698 | +.1780 | +9.6007 | .9624 |
| 18 | 10 Pleiadum | 8 | + 5 | —66 | 7 6.7 | — 8 38 50 | —0.7216 | .5685 | +.1778 | +9.6060 | .9614 |
| 18 | 11 Pleiadum | 8½ | +14 | —60 | 7 11.8 | — 8 33 56 | —0.5542 | .5691 | +.1776 | +9.6034 | .9619 |
| 18 | 12 Pleiadum | 7½ | —10 | —66 | 7 19.4 | — 8 26 40 | —0.9530 | .5687 | +.1774 | +9.6105 | .9605 |
| 18 | 13 Pleiadum | 8½ | +22 | —52 | 7 22.0 | — 8 24 9 | —0.4161 | .5696 | +.1774 | +9.6016 | .9622 |
| 18 | 14 Pleiadum | 9 | +35 | —39 | 7 24.4 | — 8 21 49 | —0.1779 | .5707 | +.1773 | +9.5975 | .9630 |
| 18 | 15 Pleiadum | 8½ | +15 | —59 | 7 26.8 | — 8 19 30 | —0.5380 | .5691 | +.1772 | +9.6039 | .9618 |
| 18 | 16 Pleiadum | 9½ | +32 | —42 | 7 27.3 | — 8 19 3 | —0.2214 | .5704 | +.1772 | +9.5985 | .9628 |
| 18 | 17 Pleiadum | 8 | +38 | —37 | 7 27.9 | — 8 18 31 | —0.1275 | .5708 | +.1772 | +9.5969 | .9631 |
| 18 | 18 Pleiadum | 8 | +15 | —59 | 7 27.9 | — 8 18 26 | —0.5442 | .5690 | +.1772 | +9.6041 | .9617 |
| 18 | *ρ* Pleiadum | 7½ | +16 | —58 | 7 28.7 | — 8 17 44 | —0.5189 | .5691 | +.1772 | +9.6037 | .9618 |
| 18 | 19 Pleiadum | 8 | +43 | —32 | 7 29.0 | — 8 17 23 | —0.0342 | .5712 | +.1772 | +9.5952 | .9634 |
| 18 | 20 Pleiadum | 8 | —13 | —66 | 7 29.3 | — 8 17 11 | —0.9933 | .5670 | +.1772 | +9.6118 | .9602 |
| 18 | 21 Pleiadum | 8½ | —18 | —66 | 7 30.2 | — 8 16 14 | —1.0597 | .5668 | +.1771 | +9.6129 | .9600 |
| 18 | 22 Pleiadum | 8 | +28 | —47 | 7 30.3 | — 8 16 12 | —0.3138 | .5700 | +.1771 | +9.6002 | .9625 |
| 18 | 23 Pleiadum | 8½ | +41 | —34 | 7 31.6 | — 8 14 57 | —0.0692 | .5711 | +.1771 | +9.5960 | .9633 |
| 18 | 24 Pleiadum | 8 | + 7 | —66 | 7 32.0 | — 8 14 31 | —0.6834 | .5683 | +.1771 | +9.6067 | .9612 |
| 18 | *η* Tauri | 3 | +17 | —57 | 7 31.9 | — 8 14 37 | —0.4985 | .5691 | +.1771 | +9.6035 | .9618 |
| 18 | 25 Pleiadum | 8½ | +45 | —30 | 7 35.6 | — 8 11 5 | +0.0115 | .5713 | +.1770 | +9.5948 | .9635 |
| 18 | 26 Pleiadum | 9 | +50 | —26 | 7 38.1 | — 8 8 42 | +0.0857 | .5716 | +.1769 | +9.5937 | .9637 |
| 18 | 27 Pleiadum | 8½ | + 8 | —65 | 7 49.6 | — 7 57 36 | —0.6637 | .5682 | +.1760 | +9.6071 | .9612 |
| 18 | 28 Pleiadum | 7 | +60 | —18 | 7 53.3 | — 7 54 1 | +0.2528 | .5727 | +.1758 | +9.5915 | .9641 |
| 18 | 29 Pleiadum | 8 | + 8 | —65 | 7 56.3 | — 7 51 13 | —0.6692 | .5688 | +.1757 | +9.6076 | .9611 |
| 18 | *s* Pleiadum | 7½ | +37 | —38 | 8 7.6 | — 7 40 16 | —0.1460 | .5712 | +.1751 | +9.5992 | .9627 |
| 18 | *f* Pleiadum | 4½ | +25 | —47 | 8 12.7 | — 7 35 25 | —0.3317 | .5704 | +.1749 | +9.6026 | .9620 |
| 18 | *h* Pleiadum | 5½ | +22 | —52 | 8 13.2 | — 7 34 58 | —0.4158 | .5700 | +.1749 | +9.6042 | .9617 |
| 18 | 30 Pleiadum | 8½ | +36 | —38 | 8 13.9 | — 7 36 16 | —0.1605 | .5712 | +.1748 | +9.5998 | .9626 |
| 18 | 31 Pleiadum | 8 | + 8 | —65 | 8 15.1 | — 7 33 8 | —0.6707 | .5690 | +.1748 | +9.6086 | .9609 |
| 18 | 32 Pleiadum | 8 | + 9 | —65 | 8 17.1 | — 7 31 12 | —0.6500 | .5699 | +.1747 | +9.6084 | .9610 |
| 18 | 33 Pleiadum | 8½ | +17 | —57 | 8 18.9 | — 7 29 24 | —0.5101 | .5694 | +.1746 | +9.6061 | .9613 |
| 18 | 34 Pleiadum | 7½ | +48 | —28 | 8 26.7 | — 7 21 54 | +0.0518 | .5721 | +.1742 | +9.5967 | .9632 |
| 18 | 35 Pleiadum | 9 | +18 | —56 | 8 26.7 | — 7 21 54 | —0.4844 | .5698 | +.1742 | +9.6060 | .9614 |
| 18 | 36 Pleiadum | 9 | +20 | —54 | 8 30.6 | — 7 18 8 | —0.4463 | .5700 | +.1740 | +9.6055 | .9615 |
| 18 | 37 Pleiadum | 8 | +13 | —61 | 8 31.2 | — 7 17 39 | —0.5782 | .5694 | +.1740 | +9.6078 | .9610 |
| 18 | 38 Pleiadum | 8 | +41 | —34 | 8 32.4 | — 7 16 26 | —0.0703 | .5716 | +.1740 | +9.5991 | .9627 |
| 18 | 39 Pleiadum | 8 | + 7 | —66 | 8 43.5 | — 7 5 46 | —0.6907 | .5691 | +.1735 | +9.6103 | .9606 |
| 18 | 40 Pleiadum | 7½ | +38 | —36 | 8 54.2 | — 6 55 32 | —0.1234 | .5716 | +.1722 | +9.6012 | .9623 |
| 18 | 33 Tauri | 6 | +90 | +31 | 11 25.0 | — 4 26 32 | +1.0814 | .5773 | +.1672 | +9.5875 | .9648 |
| 18 | 36 Tauri | 6½ | +86 | + 2 | 14 19.5 | — 1 42 44 | +0.5937 | .5766 | +.1592 | +9.6044 | .9617 |
| 18 | *χ* Tauri | 5½ | +49 | —23 | 21 33.8 | + 5 14 43 | +0.0752 | .5764 | +.1401 | +9.6306 | .9563 |
| 19 | B A.C. 1648 | 6½ | +41 | —24 | 20 34.2 | + 3 20 47 | —0.0608 | .5792 | +.0727 | +9.6689 | .9467 |
| 19 | *β* Tauri | 2 | +10 | —55 | 22 38.2 | + 5 19 52 | —0.6149 | .5762 | +.0667 | +9.6784 | .9440 |
| 19 | B.A.C. 1709 | 6½ | —29 | —61 | 23 57.1 | + 6 35 38 | —1.1374 | .5732 | +.0605 | +9.6865 | .9415 |
| 20 | B.A.C. 1746 | 6½ | +85 | +10 | 2 27.5 | + 9 0 7 | +0.5624 | .5821 | +.0544 | +9.6654 | .9477 |
| 20 | B.A.C. 1772 | 6 | —16 | —61 | 3 44.7 | +10 14 15 | —0.9904 | .5736 | +.0514 | +9.6874 | .9413 |
| 20 | 136 Tauri | 5 | +90 | +28 | 9 19.6 | — 8 24 6 | +0.8549 | .5826 | +.0301 | +9.6655 | .9477 |
| 20 | B.A.C. 1882 | 6½ | +16 | —45 | 10 34.1 | — 7 12 33 | —0.4997 | .5750 | +.0300 | +9.6844 | .9422 |
| 20 | *κ* Aurigæ | 4 | —19 | —61 | 18 1.7 | — 0 2 27 | —1.0271 | .5704 | +.0057 | +9.6930 | .9395 |
| 21 | B.A.C. 2097 | 6½ | +61 | — 2 | 0 3.4 | + 5 45 10 | +0.2600 | .5753 | —.0123 | +9.6759 | .9447 |
| 21 | 49 Aurigæ | 5½ | +72 | + 5 | 2 0.4 | + 7 37 37 | +0.4148 | .5753 | —.0182 | +9.6735 | .9454 |
| 21 | 23 Aurigæ | 6½ | + 8 | —54 | 3 15.8 | + 8 50 4 | —0.6324 | .5695 | —.0211 | +9.6869 | .9414 |
| 21 | 54 Aurigæ | 6 | +51 | —10 | 3 45.3 | + 9 18 27 | +0.1108 | .5736 | —.0212 | +9.6770 | .9444 |
| 21 | 28 Geminor. | 6 | + 4 | —60 | 5 50.5 | +11 18 50 | —0.7063 | 0.5685 | —.0270 | +9.6871 | 9.9414 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p'* | *q'* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Sept. 21 | 47 Geminor. | 6 | +90 | +32 | 16 48.3 | — 2 8 20 | +0.9464 | 0.5715 | —.0585 | +9.6584 | 9.9496 |
| 21 | 53 Geminor. | 6 | +28 | —35 | 18 40.2 | — 0 20 37 | —0.2870 | .5639 | —.0640 | +9.6737 | .9453 |
| 21 | 59 Geminor. | 6½ | +28 | —36 | 22 16.1 | + 3 7 10 | —0.2922 | .5612 | —.0748 | +9.6704 | .9463 |
| 21 | ι Geminor. | 4 | +17 | —49 | 22 45.9 | + 3 35 52 | —0.5086 | .5553 | —.0750 | +9.6867 | .9415 |
| 22 | $b^1$ Geminor. | 5½ | —14 | —62 | 0 16.1 | + 5 2 41 | —0.9779 | .5563 | —.0802 | +9.6774 | .9443 |
| 22 | $b^2$ Geminor. | 5½ | + 1 | —62 | 0 27.9 | + 5 14 3 | —0.7802 | .5577 | —.0802 | +9.6746 | .9451 |
| 22 | B.A.C. 2472 | 6 | — 3 | —62 | 0 49.9 | + 5 35 15 | —0.8110 | .5580 | —.0802 | +9.6746 | .9451 |
| 22 | υ Geminor. | 5 | +48 | —19 | 3 5.1 | + 7 45 31 | +0.0621 | .5595 | —.0881 | +9.6602 | .9490 |
| 22 | c Geminor. | 6 | +90 | +25 | 6 36.2 | +11 8 55 | +0.9003 | .5618 | —.0957 | +9.6438 | .9532 |
| 22 | φ Geminor. | 5 | +12 | —56 | 10 36.9 | — 8 59 6 | —0.5868 | .5521 | —.1059 | +9.6590 | .9494 |
| 22 | $\omega^1$ Cancri | 6 | +78 | 0 | 13 52.7 | — 5 50 18 | +0.4990 | .5535 | —.1155 | +9.6385 | .9545 |
| 22 | $\omega^2$ Cancri | 6½ | +90 | +16 | 14 14.3 | — 5 29 29 | +0.7801 | .5549 | —.1156 | +9.6337 | .9555 |
| 22 | $\psi^1$ Cancri | 6½ | +17 | —53 | 17 56.7 | — 1 54 56 | —0.5023 | .5463 | —.1249 | +9.6460 | .9527 |
| 22 | $\psi^2$ Cancri | 4 | +35 | —35 | 18 3.7 | — 1 48 10 | —0.1696 | .5478 | —.1250 | +9.6409 | .9539 |
| 22 | λ Cancri | 6 | +90 | +17 | 22 32.8 | + 2 31 33 | +0.8292 | .5490 | —.1341 | +9.6173 | .9591 |
| 23 | $\upsilon^1$ Cancri | 7 | +38 | —34 | 1 19.1 | + 5 12 7 | —0.1224 | .5430 | —.1407 | +9.6259 | .9573 |
| 23 | $\upsilon^2$ Cancri | 6½ | +55 | —19 | 2 10.7 | + 6 1 54 | +0.1700 | .5432 | —.1429 | +9.6197 | .9586 |
| 23 | B.A.C. 2850 | 7 | +38 | —34 | 2 39.1 | + 6 29 21 | —0.1144 | .5425 | —.1429 | +9.6230 | .9579 |
| 23 | $\upsilon^3$ Cancri | 6 | +47 | —26 | 3 31.5 | + 7 20 0 | +0 0360 | .5422 | —.1451 | +9.6187 | .9588 |
| 23 | 32 Cancri | 7 | +41 | —32 | 4 12.1 | + 7 59 13 | —0.0721 | .5407 | —.1471 | +9.6188 | .9588 |
| 23 | ξ Cancri | 5 | + 3 | —66 | 21 12.8 | + 0 26 4 | —0.7530 | .5249 | —.1799 | +9.5851 | .9652 |
| 23 | 79 Cancri | 6 | + 1 | —68 | 21 41.5 | + 0 53 51 | —0.7879 | .5253 | —.1799 | +9.5843 | .9654 |
| 23 | B.A.C. 3138 | 6 | +58 | —21 | 23 16.6 | + 2 25 56 | +0.2300 | .5270 | —.1834 | +9.5616 | .9690 |
| 25 | η Leonis | 3½ | —11 | —73 | 2 15.6 | + 4 35 15 | —1.0002 | .5048 | —.2221 | +9.4772 | .9795 |
| 25 | 37 Leonis | 6 | +90 | +30 | 7 11.7 | + 9 22 45 | +1.2028 | .5068 | —.2278 | +9.3969 | .9861 |
| 25 | 42 Leonis | 6 | + 2 | —65 | 9 54.1 | —11 59 36 | —0.7968 | .5005 | —.2310 | +9.4323 | .9835 |
| 25 | B.A.C. 3579 | 6 | — 9 | —75 | 13 37.4 | — 8 22 40 | —0.9763 | .4988 | —.2338 | +9.4151 | .9848 |
| 25 | *i* Leonis | 6 | —23 | —75 | 15 26.2 | — 6 37 1 | —1.1795 | .4973 | —.2358 | +9.4094 | .9852 |
| 26 | *l* Leonis | 5 | +77 | —15 | 0 42.8 | + 2 24 0 | +0.5238 | .4961 | —.2435 | +9.2923 | .9915 |
| 30 | B.A.C. 4679 | 6½ | +78 | — 2 | 15 0.3 | —10 15 21 | +0.8143 | .4943 | —.2352 | —9.3922 | .9864 |
| Oct. 2 | $\iota^1$ Libræ | 4½ | —47 | —90 | 2 19.3 | + 0 2 0 | —1.2963 | .5190 | —.1923 | —9.5180 | .9750 |
| 2 | B A.C. 5023 | 6 | +68 | +30 | 4 20.1 | + 1 59 12 | +1.2137 | .5127 | —.1891 | —9.5711 | .9676 |
| 2 | 42 Libræ | 5½ | +66 | — 5 | 16 0.7 | —10 42 2 | +0.7456 | .5223 | —.1874 | —9.5981 | .9629 |
| 2 | B.A.C. 5197 | 6 | +66 | +48 | 18 39.3 | — 8 8 31 | +1.3125 | .5211 | —.1653 | —9.6138 | .9598 |
| 2 | B.A.C. 5253 | 6 | +57 | —16 | 22 30.5 | — 4 24 45 | +0.5146 | .5272 | —.1579 | —9.6110 | .9605 |
| 2 | B.A C. 5254 | 6 | +25 | —34 | 22 32.4 | — 4 22 55 | —0.1020 | .5293 | —.1579 | —9.6016 | .9622 |
| 2 | 3 Scorpii | 6 | +65 | +37 | 22 51.0 | — 4 4 52 | +1.2465 | .5243 | —.1570 | —9.6230 | .9579 |
| 3 | B.A.C. 5286 | 6½ | +66 | + 6 | 0 42.9 | — 2 16 14 | +0.8900 | .5270 | —.1541 | —9.6164 | .9593 |
| 3 | σ Scorpii | 3½ | +23 | —49 | 11 12.3 | + 7 52 5 | —0.0738 | .5301 | —.1301 | —9.6299 | .9564 |
| 3 | α Scorpii | 1½ | +47 | —23 | 14 56.1 | +11 28 16 | +0.3977 | .5276 | —.1239 | —9.6436 | .9532 |
| 3 | 22 Scorpii | 5 | —35 | —90 | 15 20.1 | +11 51 31 | —1.0932 | .5470 | —.1232 | —9.6227 | .9580 |
| 4 | B.A.C. 5800 | 6½ | —23 | —90 | 10 48.6 | + 6 39 23 | —0.8395 | .5556 | —.0774 | —9.6542 | .9506 |
| 4 | 43 Ophiuchi | 6 | +29 | —35 | 14 43.3 | +10 25 42 | +0.1713 | .5531 | —.0672 | —9.6716 | .9459 |
| 5 | 3 Sagittarii | 5 | —14 | —90 | 1 3.7 | — 3 36 26 | —0.6078 | .5554 | —.0375 | —9.6684 | .9469 |
| 5 | B.A.C. 6063 | 6½ | — 7 | —75 | 5 3.1 | + 0 14 29 | —0.4548 | .5559 | —.0261 | —9.6722 | .9458 |
| 5 | B.A C. 6072 | 6½ | +30 | —30 | 5 50.7 | + 1 0 25 | +0.2616 | .5532 | —.0266 | —9.6819 | .9429 |
| 5 | $\gamma^1$ Sagittarii | 5 | +61 | +27 | 8 21.5 | + 3 25 17 | +1.1036 | .5489 | —.0184 | —9.6935 | .9393 |
| 5 | B.A.C. 6120 | 6½ | +11 | —50 | 9 7.8 | + 4 9 49 | —0.0881 | .5631 | —.0166 | —9.6783 | .9440 |
| 5 | B.A.C. 6127 | 5 | +10 | —51 | 9 40.3 | + 4 41 6 | —0.0981 | .5634 | —.0158 | —9.6783 | .9440 |
| 5 | B.A.C. 6190 | 6½ | +20 | —38 | 13 33.0 | + 8 25. 10 | +0.1069 | 5634 | —.0046 | —9.6814 | .9431 |
| 5 | B.A.C. 6191 | 6½ | — 1 | —62 | 13 33.3 | + 8 25 25 | —0.2857 | .5653 | —.0046 | —9.6762 | .9446 |
| 5 | B.A.C. 6220 | 6½ | + 8 | —51 | 15 28.5 | +10 16 18 | —0.1110 | .5653 | +.0010 | —9.6786 | .9439 |
| 6 | τ Sagittarii | 3½ | + 7 | —60 | 10 3.0 | + 4 8 49 | —0.2447 | .5690 | +.0556 | —9.6698 | .9464 |
| 6 | B.A.C. 6628 | 6 | +49 | —17 | 17 15.4 | +11 4 51 | +0.4999 | .5656 | +.0757 | —9.6736 | .9454 |
| 6 | B.A.C. 6666 | 6 | +10 | —59 | 19 29.0 | —10 46 38 | —0.2320 | 0.5692 | +.0815 | —9.6611 | 9.9488 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Oct. 7 | ω Sagittarii | 5½ | +33 | —35 | 6 11.1 | — 0 28 51 | +0.1769 | 0.5668 | +.1123 | —9.6522 | 9.9511 |
| 7 | b Sagittarii | 5 | +63 | +28 | 6 38.1 | — 0 2 50 | +1.1361 | .5622 | +.1123 | —9.6651 | .9477 |
| 7 | A Sagittarii | 5 | +34 | —32 | 7 29.3 | + 0 46 22 | +0.2242 | .5661 | +.1150 | —9.6508 | .9515 |
| 7 | B.A.C. 7077 | 6 | +65 | + 9 | 21 36.3 | — 9 38 20 | +0.9194 | .5598 | +.1464 | —9.6328 | .9557 |
| 8 | B.A.C. 7197 | 6 | +17 | —60 | 4 9.0 | — 3 20 14 | —0.2628 | .5647 | +.1704 | —9.5964 | .9632 |
| 8 | B.A.C. 7237 | 6 | +66 | +27 | 6 5.3 | — 1 28 17 | +1.1628 | .5582 | +.1753 | —9.6147 | .9597 |
| 8 | B.A.C. 7335 | 6 | +19 | —59 | 12 43.5 | + 4 55 20 | —0.2479 | .5603 | +.1888 | —9.5692 | .9679 |
| 8 | 27 Capricor. | 6 | —11 | —90 | 13 9.1 | + 5 20 0 | —0.8183 | .5621 | +.1911 | —9.5569 | .9698 |
| 8 | φ Capricor. | 6 | +23 | —56 | 15 44.9 | + 7 50 5 | —0.1983 | .5591 | +.1956 | —9.5591 | .9694 |
| 9 | 33 Capricor. | 6 | +67 | — 4 | 19 23.7 | +11 20 52 | +0.7509 | .5568 | +.2045 | —9.5632 | .9688 |
| 9 | 37 Capricor. | 6 | +70 | + 9 | 0 0.5 | — 8 12 19 | +0.9654 | .5523 | +.2150 | —9.5488 | .9710 |
| 9 | ε Capricor. | 4½ | +64 | —16 | 0 58.5 | — 7 16 20 | +0.5496 | .5527 | +.2168 | —9.5363 | .9727 |
| 9 | κ Capricor. | 5 | +61 | —19 | 3 23.3 | — 4 56 50 | +0.4801 | .5512 | +.2205 | —9.5239 | .9743 |
| 9 | B.A.C. 7550 | 6 | +70 | +39 | 3 37.5 | — 4 43 7 | +1.2957 | .5483 | +.2205 | —9.5396 | .9722 |
| 9 | 29 Aquarii | 6 | +68 | —14 | 12 2.3 | + 3 23 37 | +0.5812 | .5495 | +.2381 | —9.4817 | .9791 |
| 10 | 45 Aquarii | 6 | —37 | —90 | 19 21.7 | +10 27 34 | —1.2782 | .5523 | +.2500 | —9.3843 | .9869 |
| 10 | 50 Aquarii | 6 | +17 | —71 | 21 45.6 | —11 13 38 | —0.4386 | .5494 | +.2531 | —9.3913 | .9864 |
| 10 | 56 Aquarii | 6 | +75 | +33 | 0 20.3 | — 8 44 20 | +1.2803 | .5442 | +.2574 | —9.4219 | .9843 |
| 10 | 70 Aquarii | 6 | +12 | —80 | 8 29.1 | — 0 52 31 | —0.5671 | .5469 | +.2687 | —9.2925 | .9915 |
| 10 | 74 Aquarii | 6 | +78 | +15 | 10 41.4 | + 1 15 10 | +1.0867 | .5415 | +.2708 | —9.3311 | .9898 |
| 10 | h¹ Aquarii | 6 | —40 | —90 | 15 57.7 | + 6 20 31 | —1.3434 | .5461 | +.2777 | —9.1680 | .9952 |
| 11 | ψ¹ Aquarii | 4½ | +80 | +43 | 20 45.3 | +10 58 23 | +1.3823 | .5419 | +.2818 | —9.2339 | .9935 |
| 11 | χ Aquarii | 5½ | +52 | —36 | 21 13.6 | +11 25 35 | +0.1718 | .5434 | +.2828 | —9.1700 | .9952 |
| 11 | 20 Piscium | 6 | + 3 | —90 | 11 16.4 | + 0 59 36 | —0.8187 | .5190 | +.2886 | —8.7718 | .9992 |
| 11 | 29 Piscium | 5½ | +86 | +56 | 17 31.5 | + 7 1 46 | +1.4441 | .5427 | +.2951 | —8.8240 | 9.9990 |
| 12 | JUPITER | | +71 | —22 | 0 40.7 | —10 3 43 | +0.4467 | .5508 | +.2996 | —8.0492 | 0.0000 |
| 12 | 44 Piscium | 6 | +30 | —60 | 4 7.9 | — 6 43 38 | —0.2830 | .5445 | +.2968 | +8.3019 | 9.9999 |
| 12 | B.A.C. 221 | 6 | +15 | —79 | 14 19.6 | + 3 6 58 | —0.5824 | .5465 | +.2949 | +8.8991 | .9986 |
| 12 | ι Piscium | 4 | —21 | —83 | 20 49.5 | + 9 23 14 | —1.1849 | .5475 | +.2926 | +9.0932 | .9966 |
| 13 | ζ Piscium | 6 | +73 | —19 | 1 33.4 | —10 2 49 | +0.4856 | .5513 | +.2896 | +9.0746 | .9969 |
| 13 | π Piscium | 5 | —16 | —79 | 11 42.2 | — 0 15 40 | —1.1008 | .5522 | +.2808 | +9.2963 | .9913 |
| 14 | 27 Arietis | 6 | +13 | —70 | 10 22.7 | — 2 23 52 | —0.6061 | .5517 | +.2489 | +9.4677 | .9804 |
| 14 | 40 Arietis | 6 | +79 | — 9 | 17 36.7 | + 4 32 46 | +0.5380 | .5591 | +.2357 | +9.4826 | .9790 |
| 14 | ρ² Arietis | 6 | +90 | +30 | 20 34.4 | + 7 23 41 | +1.1652 | .5756 | +.2296 | +9.4841 | .9788 |
| 14 | 47 Arietis | 6 | — 8 | —70 | 21 26.4 | + 8 13 43 | —0.9432 | .5688 | +.2275 | +9.5360 | .9727 |
| 15 | δ Arietis | 4½ | +90 | +33 | 2 54.9 | —10 30 24 | +1.1655 | .5800 | +.2141 | +9.5167 | .9752 |
| 15 | ζ Arietis | 4½ | +52 | —27 | 4 12.7 | — 9 15 39 | +0.1311 | .5765 | +.2118 | +9.5446 | .9715 |
| 15 | τ¹ Arietis | 5 | +80 | — 6 | 6 43.7 | — 6 50 32 | +0.5428 | .5792 | +.2073 | +9.5470 | .9712 |
| 15 | τ² Arietis | 6 | +90 | +26 | 7 20.9 | — 6 14 44 | +1.0678 | .5818 | +.2049 | +9.5388 | .5723 |
| 15 | 65 Arietis | 6 | +90 | +31 | 8 0.6 | — 5 36 36 | +1.1374 | .5829 | +.2024 | +9.5401 | .9722 |
| 15 | 9 Tauri | 6 | +28 | —48 | 12 55.0 | — 0 53 47 | —0.3122 | .5796 | +.1900 | +9.5871 | .9649 |
| 15 | g Pleiadum | 5½ | — 2 | —66 | 15 58.1 | + 2 2 3 | —0.8352 | .5781 | +.1832 | +9.6066 | .9613 |
| 15 | b Pleiadum | 5½ | + 9 | —65 | 16 0.0 | + 2 3 54 | —0.6548 | .5789 | +.1832 | +9.6035 | .9619 |
| 15 | ε Tauri | 5 | —12 | —66 | 16 7.3 | + 2 10 54 | —0.9854 | .5776 | +.1828 | +9.6096 | .9607 |
| 15 | c Pleiadum | 5 | — 3 | —66 | 16 21.9 | + 2 24 57 | —0.8435 | .5782 | +.1821 | +9.6079 | .9610 |
| 15 | d Pleiadum | 5 | +23 | —51 | 16 34.3 | + 2 36 47 | —0.3908 | .5807 | +.1816 | +9.6007 | .9624 |
| 15 | η Tauri | 3 | +19 | —55 | 17 1.2 | + 3 2 39 | —0.4685 | .5800 | +.1802 | +9.6035 | .9618 |
| 15 | 28 Pleiadum | 7 | +61 | —17 | 17 21.9 | + 3 22 31 | +0.2700 | .5834 | +.1794 | +9.5915 | .9641 |
| 15 | f Pleiadum | 4½ | +28 | —46 | 17 40.6 | + 3 40 29 | —0.3041 | .5809 | +.1785 | +9.6027 | .9620 |
| 15 | h Pleiadum | 5½ | +24 | —50 | 17 41.1 | + 3 40 56 | —0.3858 | .5805 | +.1784 | +9.6042 | .9617 |
| 15 | 40 Pleiadum | 7½ | +40 | —35 | 18 20.8 | + 4 19 3 | —0.0994 | .5821 | +.1767 | +9.6012 | .9623 |
| 15 | 33 Tauri | 6 | +90 | +31 | 20 46.5 | + 6 38 57 | +1.0879 | .5883 | +.1714 | +9.5876 | 9648 |
| 15 | 36 Tauri | 6½ | +87 | + 2 | 23 35.0 | + 9 20 43 | +0.6073 | .5875 | +.1630 | +9.6044 | .9617 |
| 16 | χ Tauri | 5½ | +50 | — 3 | 6 34.5 | — 7 56 40 | +0.0968 | .5878 | +.1429 | +9.6306 | .9563 |
| 17 | B.A.C. 1648 | 6½ | +42 | —22 | 4 47.4 | —10 38 15 | —0.0378 | 0.5899 | +.0747 | +9.6689 | 9.9467 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Northern. | Southern. | | $H$ | $Y$ | $p'$ | $q'$ | Log sin $D$ | Log cos $D$ |
| | | | | ° | ° | h. m. | h. m. s. | | | | | |
| Oct. | 17 | β Tauri | 2 | +11 | −53 | 6 47.3 | − 8 44 18 | −0.5830 | 0.5831 | +.0683 | +9.6784 | 9.9440 |
| | 17 | B.A.C. 1746 | 6½ | +86 | +10 | 10 29.1 | − 5 10 38 | +0.5748 | .5910 | +.0552 | +9.6654 | .9477 |
| | 17 | B.A.C. 1772 | 6 | −13 | −61 | 11 43.7 | − 3 59 3 | −0.9513 | .5830 | +.0521 | +9.6873 | .9413 |
| | 17 | 136 Tauri | 5 | +90 | +29 | 17 7.4 | + 1 11 24 | +0.8648 | .5926 | +.0329 | +9.6655 | .9477 |
| | 17 | B.A.C. 1882 | 6½ | +18 | −43 | 18 19.8 | + 2 20 55 | −0.4715 | .5765 | +.0297 | +9.6444 | .9422 |
| | 18 | κ Aurigæ | 4 | −16 | −61 | 1 33.7 | + 9 17 12 | −0.9924 | .5802 | +.0073 | +9.6930 | .9395 |
| | 18 | B.A.C. 2097 | 6½ | +62 | − 1 | 7 24.9 | − 9 5 44 | +0.2751 | .5841 | −.0116 | +9.6759 | .9447 |
| | 18 | 49 Aurigæ | 5½ | +73 | + 6 | 9 18.5 | − 7 16 40 | +0.4271 | .5838 | −.0178 | +9.6735 | .9454 |
| | 18 | 53 Aurigæ | 6½ | +10 | −52 | 10 35.7 | − 6 2 24 | −0.6073 | .5789 | −.0209 | +9.6869 | .9414 |
| | 18 | 54 Aurigæ | 6 | +52 | −10 | 11 4.4 | − 5 34 50 | +0.1270 | .5818 | −.0239 | +9.6770 | .9444 |
| | 18 | 28 Geminor. | 6 | + 5 | −58 | 13 2.3 | − 3 41 49 | −0.6787 | .5757 | −.0300 | +9.6871 | .9413 |
| | 18 | 47 Geminor. | 6 | +90 | +32 | 23 43.2 | + 6 34 5 | +0.9513 | .5782 | −.0596 | +9.6584 | .9496 |
| | 19 | 53 Geminor. | 6 | +30 | −34 | 1 32.5 | + 8 19 8 | −0.2666 | .5704 | −.0652 | +9.6736 | .9454 |
| | 19 | 59 Geminor. | 6½ | −12 | −62 | 5 3.3 | +11 41 55 | −0.7971 | .5671 | −.0764 | +9.6703 | .9463 |
| | 19 | ι Geminor. | 4 | +17 | −48 | 5 32.3 | −11 50 10 | −0.4860 | .5665 | −.0764 | +9.6728 | .9456 |
| | 19 | $b^1$ Geminor. | 5½ | −12 | −62 | 7 0.5 | −10 25 22 | −0.9501 | .5621 | −.0818 | +9.6774 | .9442 |
| | 19 | $b^2$ Geminor. | 5½ | + 1 | −62 | 7 13.0 | −10 13 19 | −0.7553 | .5634 | −.0818 | +9.6746 | .9451 |
| | 19 | B.A.C. 2472 | 6 | − 1 | −62 | 7 33.5 | − 9 53 32 | −0.7852 | .5635 | −.0819 | +9.6746 | .9451 |
| | 19 | υ Geminor. | 5 | +49 | −18 | 9 45.8 | − 7 46 12 | +0.0776 | .5661 | −.0874 | +9.6602 | .9490 |
| | 19 | c Geminor. | 6 | +90 | +24 | 13 12.7 | − 4 26 5 | +0.9038 | .5665 | −.1050 | +9.6438 | .9532 |
| | 19 | φ Geminor. | 5 | +13 | −55 | 17 8.7 | − 0 39 47 | −0.5656 | .5562 | −.1081 | +9.6590 | .9494 |
| | 19 | $\omega^1$ Cancri | 6 | +79 | + 1 | 20 20.9 | + 2 25 27 | +0.5083 | .5589 | −.1155 | +9.6385 | .9545 |
| | 19 | $\omega^2$ Cancri | 6½ | +90 | +16 | 20 42.1 | + 2 45 51 | +0.7879 | .5601 | −.1155 | +9.6337 | .9555 |
| | 20 | $\psi^1$ Cancri | 6½ | +18 | −52 | 0 20.8 | + 6 16 38 | −0.4838 | .5507 | −.1251 | +9.6460 | .9527 |
| | 20 | $\psi^2$ Cancri | 4 | +36 | −34 | 0 27.6 | + 6 23 16 | −0.1542 | .5522 | −.1251 | +9.6409 | .9539 |
| | 20 | λ Cancri | 6 | +90 | +16 | 4 54.3 | +10 40 27 | +0.8314 | .5516 | −.1367 | +9.6172 | .9591 |
| | 20 | $\upsilon^1$ Cancri | 7 | +38 | −33 | 7 36.4 | −10 43 5 | −0.1085 | .5463 | −.1410 | +9.6259 | .9573 |
| | 20 | $\upsilon^2$ Cancri | 6½ | +55 | −19 | 8 28.6 | − 9 52 44 | +0.1780 | .5468 | −.1433 | +9.6197 | .9586 |
| | 20 | B.A.C. 2840 | 7 | +39 | −33 | 8 57.1 | − 9 25 15 | −0.1051 | .5440 | −.1453 | +9.6230 | .9579 |
| | 20 | $\upsilon^3$ Cancri | 6 | +47 | −25 | 9 47.0 | − 8 37 2 | +0.0484 | .5455 | −.1454 | +9.6187 | .9588 |
| | 20 | 32 Cancri | 7 | +41 | −31 | 10 27.1 | − 7 58 21 | −0.0591 | .5440 | −.1475 | +9.6188 | .9588 |
| | 21 | ξ Cancri | 5 | + 5 | −67 | 3 12.1 | + 8 12 51 | −0.7251 | .5263 | −.1804 | +9.5851 | .9652 |
| | 21 | 79 Cancri | 6 | + 2 | −68 | 3 45.1 | + 8 44 56 | −0.7741 | .5266 | −.1804 | +9.5843 | .9654 |
| | 21 | B.A.C. 3138 | 6 | +28 | −48 | 5 19.8 | +10 16 32 | −0.3007 | .5230 | −.1827 | +9.5711 | .9676 |
| | 22 | η Leonis | 3½ | − 9 | −73 | 8 11.8 | −11 41 7 | −0.9913 | .4900 | −.2220 | +9.4771 | .9775 |
| | 22 | 37 Leonis | 6 | +90 | +29 | 13 7.7 | − 6 53 52 | +1.1918 | .5052 | −.2274 | +9.3968 | .9860 |
| | 22 | 42 Leonis | 6 | + 3 | −68 | 15 50.0 | − 4 16 13 | −0.7900 | .5003 | −.2296 | +9.4323 | .9835 |
| | 22 | B.A.C. 3579 | 6 | − 8 | −75 | 19 33.4 | − 0 39 15 | −0.9700 | .4973 | −.2334 | +9.4151 | .9848 |
| | 23 | l Leonis | 5 | +76 | −15 | 6 39.8 | +10 8 25 | +0.5141 | .4943 | −.2429 | +9.2923 | .9915 |
| | 23 | B.A.C. 3837 | 6½ | +36 | −52 | 20 25.8 | − 0 28 16 | −0.1716 | .4874 | −.2523 | +9.1867 | .9948 |
| | 24 | σ Leonis | 4 | +90 | +14 | 0 27.3 | + 3 26 45 | +1.0549 | .4869 | −.2540 | +9.0744 | .9969 |
| | 24 | β Virginis | 3½ | +90 | +55 | 17 14.4 | − 4 12 53 | +1.4378 | .4827 | −.2601 | +8.6519 | 9.9996 |
| | 25 | 13 Virginis | 6 | +47 | −42 | 9 25.7 | +11 33 3 | +0.0540 | .4809 | −.2619 | +6.2876 | 0.0000 |
| | 25 | η Virginis | 3½ | +31 | −59 | 10 8.5 | −11 45 16 | −0.2664 | .4809 | −.2620 | +7.3604 | 0.0000 |
| | 30 | B.A.C. 5253 | 6 | −59 | +14 | 4 16.7 | + 3 8 53 | +0.5521 | .5289 | −.1577 | −9.6410 | 9.9604 |
| | 30 | B.A.C. 5254 | 6 | −48 | +26 | 4 18.6 | + 3 10 43 | −0.0641 | .5317 | −.1577 | −9.6016 | .9622 |
| | 30 | 3 Scorpii | 6 | +65 | +43 | 4 37.1 | + 3 28 38 | +1.2850 | .5265 | −.1577 | −9.6030 | .9579 |
| | 30 | B.A.C. 5286 | 6½ | +59 | −13 | 6 28.5 | + 5 16 25 | +0.5614 | .5305 | −.1507 | −9.6164 | .9593 |
| | 30 | σ Scorpii | 3½ | +25 | −46 | 16 55.7 | − 8 37 9 | −0.0301 | .5405 | −.1310 | −9.6299 | .9564 |
| | 30 | α Scorpii | 1½ | +50 | −19 | 20 38.9 | − 5 1 32 | +0.4417 | .5396 | −.1243 | −9.6436 | .9532 |
| | 30 | 22 Scorpii | 5 | −32 | −90 | 21 2.9 | − 4 38 19 | −1.0450 | .5470 | −.1221 | −9.6227 | .9580 |
| | 31 | B.A.C. 5800 | 6½ | −20 | −90 | 16 31.2 | − 9 50 36 | −0.7893 | .5565 | −.0765 | −9.6542 | .9506 |
| | 31 | 43 Ophiuchi | 6 | +32 | −32 | 20 26.5 | − 6 3 41 | +0.2259 | .5539 | −.0661 | −9.6716 | .9459 |
| Nov. | 1 | 3 Sagittarii | 5 | −11 | −85 | 6 49.7 | + 3 56 57 | −0.5610 | .5617 | −.0396 | −9.6684 | .9469 |
| | 1 | B.A.C. 6063 | 6½ | − 4 | −71 | 10 42.2 | + 7 40 58 | −0.3991 | 0.5622 | −.0288 | −9.6722 | 9.9458 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p'* | *q'* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Nov. 1 | B.A.C. 6072 | 6½ | +34 | −26 | 11 30.4 | + 8 27 26 | +0.3305 | 0.5587 | −.0260 | −9.6819 | 9.9429 |
| 1 | $\gamma^1$ Sagittarii | 4 | +61 | +36 | 14 10.6 | +11 1 46 | +1.1863 | .5555 | −.0178 | −9.6935 | .9393 |
| 1 | B.A.C. 6120 | 6½ | +14 | −46 | 14 57.2 | +11 46 41 | −0.0279 | .5619 | −.0150 | −9.6782 | .9440 |
| 1 | B.A.C. 6127 | 5 | +14 | −47 | 15 30.0 | −11 41 45 | −0.0374 | .5618 | −.0150 | −9.6782 | .9440 |
| 1 | B.A.C. 6190 | 6½ | +23 | −35 | 19 24.9 | − 7 55 33 | +0.1704 | .5617 | −.0039 | −9.6814 | .9431 |
| 1 | B.A.C. 6191 | 6½ | + 3 | −58 | 19 25.1 | − 7 55 19 | −0.2243 | .5636 | −.0039 | −9.6763 | .9446 |
| 1 | B.A.C. 6220 | 6½ | +12 | −47 | 21 21.5 | − 6 3 15 | −0.0478 | .5631 | +.0017 | −9.6786 | .9439 |
| 2 | τ Sagittarii | 3½ | +10 | −55 | 16 11.4 | −11 55 19 | −0.1778 | .5649 | +.0551 | −9.6698 | .9464 |
| 2 | B.A.C. 6628 | 6 | +52 | −13 | 23 19.3 | − 5 3 19 | +0.5615 | .5607 | +.0745 | −9.6736 | .9454 |
| 3 | B.A.C. 6666 | 6 | +14 | −54 | 1 52.3 | − 2 35 50 | −0.1507 | .5636 | +.0828 | −9.6611 | .9488 |
| 3 | ω Sagittarii | 5½ | +37 | −30 | 12 44.5 | + 7 52 8 | +0.2536 | .5548 | +.1096 | −9.6522 | .9512 |
| 3 | *b* Sagittarii | 5 | +63 | +38 | 13 12.2 | + 8 18 45 | +1.2229 | .5546 | +.1123 | −9.6651 | .9477 |
| 3 | A Sagittarii | 5 | +40 | −28 | 14 4.6 | + 9 9 16 | +0.3018 | .5589 | +.1150 | −9.6908 | .9515 |
| 4 | B.A.C. 7077 | 6 | +65 | +15 | 4 34.7 | − 0 52 23 | +1.0097 | .5532 | +.1503 | −9.6328 | .9557 |
| 4 | B.A.C. 7197 | 6 | +20 | −55 | 11 19.3 | + 5 37 38 | −0.1869 | .5542 | +.1669 | −9.5965 | .9632 |
| 4 | B.A.C. 7335 | 6 | +23 | −55 | 20 10.4 | − 9 50 5 | −0.1721 | .5504 | +.1869 | −9.5692 | .9679 |
| 4 | 27 Capricor. | 6 | − 7 | −90 | 20 36.9 | − 9 24 33 | −0.7516 | .5527 | +.1869 | −9.5570 | .9698 |
| 4 | φ Capricor. | 6 | +27 | −51 | 23 18.0 | − 6 49 8 | −0.1212 | .5490 | +.1933 | −9.5591 | .9694 |
| 5 | 33 Capricor. | 6 | +69 | + 2 | 3 4.3 | − 3 10 46 | +0.8433 | .5442 | +.2016 | −9.5633 | .9688 |
| 5 | 37 Capricor. | 6 | +70 | +16 | 7 50.9 | + 1 25 50 | +1.0622 | .5422 | +.2093 | −9.5488 | .9710 |
| 5 | ι Capricor. | 4½ | +68 | −10 | 8 51.0 | + 2 23 53 | +0.6397 | .5435 | +.2113 | −9.5363 | .9727 |
| 5 | κ Capricor. | 5 | +66 | −14 | 11 10.9 | + 4 38 38 | +0.5694 | .5424 | +.2170 | −9.5239 | .9743 |
| 5 | 29 Aquarii | 6 | +72 | − 9 | 20 19.1 | −10 31 43 | +0.6702 | .5391 | +.2328 | −9.4817 | .9791 |
| 6 | 45 Aquarii | 6 | −31 | −90 | 3 55.0 | − 3 11 15 | −1.2232 | .5414 | +.2456 | −9.3842 | .9869 |
| 6 | 50 Aquarii | 6 | +21 | −66 | 6 24.5 | − 0 46 50 | −0.3687 | .5384 | +.2482 | −9.3913 | .9864 |
| 6 | B.A.C. 7835 | 6½ | +23 | −64 | 8 58.5 | + 1 41 56 | −0.3441 | .5379 | +.2527 | −9.3728 | .9876 |
| 6 | 56 Aquarii | 6 | +75 | +47 | 9 4.9 | + 1 48 11 | +1.3801 | .5338 | +.2527 | −9.4219 | .9843 |
| 6 | 70 Aquarii | 6 | +16 | −75 | 17 32.2 | + 9 48 31 | −0.5029 | .5364 | +.2629 | −9.2125 | .9915 |
| 6 | 74 Aquarii | 6 | +78 | +22 | 19 50.2 | −11 48 5 | +1.1814 | .5327 | +.2651 | −9.3311 | .9898 |
| 7 | $h^1$ Aquarii | 6 | −35 | −90 | 1 17.5 | − 6 31 42 | −1.2963 | .5360 | +.2716 | −9.1679 | .9952 |
| 7 | $h^2$ Aquarii | 7 | −27 | −90 | 1 22.1 | − 6 27 23 | −1.2148 | .5360 | +.2716 | −9.1710 | .9952 |
| 7 | $h^3$ Aquarii | 7 | − 8 | −90 | 1 37.8 | − 6 12 5 | −0.9594 | .5357 | +.2716 | −9.1801 | .9950 |
| 7 | $h^4$ Aquarii | 7½ | −13 | −90 | 2 14.9 | − 5 36 9 | −1.0363 | .5354 | +.2727 | −9.1679 | .9953 |
| 7 | χ Aquarii | 5½ | +56 | −32 | 6 44.7 | − 1 15 17 | +0.2417 | .5333 | +.2765 | −9.1700 | .9952 |
| 7 | 20 Piscium | 6 | + 4 | −72 | 21 15.6 | −11 13 11 | −0.7756 | .5343 | +.2869 | −8.7720 | .9992 |
| 7 | 24 Piscium | 6½ | +70 | −22 | 23 35.0 | − 8 58 20 | +0.4501 | .5338 | +.2878 | −8.8381 | .9990 |
| 8 | B.A.C. 8365 | 6½ | +16 | −58 | 5 13.9 | − 3 30 42 | −0.5539 | .5352 | +.2902 | −8.3554 | .9999 |
| 8 | JUPITER |  | +53 | −37 | 6 50.1 | − 1 57 43 | +0.1562 | .5354 | +.2902 | −8.4308 | .9998 |
| 8 | B A.C. 57 | 6½ | − 9 | −89 | 11 7.3 | + 2 10 54 | −1.0125 | .5362 | +.2916 | +8.1884 | .9999 |
| 8 | 44 Piscium | 6 | +33 | −58 | 14 38.5 | + 5 35 3 | −0.2370 | .5368 | +.2917 | +8.2983 | .9999 |
| 9 | B.A.C. 221 | 6 | +17 | −77 | 1 5.3 | − 8 19 10 | −0.5478 | .5401 | +.2907 | +8.8980 | .9986 |
| 9 | ι Piscium | 4 | −20 | −83 | 7 43.5 | − 1 54 36 | −1.1641 | .5419 | +.2885 | +9.0932 | .9966 |
| 9 | ζ Piscium | 6 | +76 | −17 | 12 32 6 | + 2 44 38 | +0.5201 | .5475 | +.2865 | +9.0744 | .9969 |
| 9 | π Piscium | 5 | −15 | −79 | 22 50.4 | −11 18 7 | −1.0917 | .5489 | +.2783 | +9.2962 | .9913 |
| 10 | 27 Arietis | 6 | +67 | −20 | 21 39.7 | +10 40 28 | +0.3656 | .5644 | +.2484 | +9.4677 | .9804 |
| 11 | 40 Arietis | 6 | +77 | −10 | 4 53.2 | − 6 22 26 | +0.5200 | .5740 | +.2336 | +9.4826 | .9790 |
| 11 | $\rho^2$ Arietis | 6 | +90 | +28 | 7 50.2 | − 3 32 12 | +1.1434 | .5773 | +.2299 | +9.4841 | .9788 |
| 11 | 47 Arietis | 6 | − 9 | −70 | 8 41.9 | − 2 41 25 | −0.9632 | .5706 | +.2278 | +9.5360 | .9727 |
| 11 | δ Arietis | 4½ | +90 | +30 | 14 8.4 | + 2 31 23 | +1.1353 | .5830 | +.2145 | +9.5167 | .9752 |
| 11 | ζ Arietis | 4½ | +50 | −28 | 15 25.5 | + 3 45 28 | +0.1015 | .5794 | +.2124 | +9.5447 | .9715 |
| 11 | $\tau^1$ Arietis | 5 | +77 | − 7 | 17 55.2 | + 6 9 13 | +0.5094 | .5838 | +.2055 | +9.5470 | .9712 |
| 11 | $\tau^2$ Arietis | 6 | +90 | +23 | 18 32.1 | + 6 44 42 | +1.0309 | .5853 | +.2055 | +9.5387 | .9723 |
| 11 | 65 Arietis | 6 | +90 | +29 | 19 11.4 | + 7 22 25 | +1.0995 | .5865 | +.2032 | +9.5401 | .9722 |
| 12 | 9 Tauri | 6 | +26 | −50 | 0 2.4 | −11 58 5 | −0.3493 | .5840 | +.1906 | +9.5872 | .9649 |
| 12 | *g* Pleiadum | 5½ | − 5 | −66 | 3 3.1 | − 9 4 39 | −0.8724 | 0.5833 | +.1828 | +9.6066 | 9.9613 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p'* | *q'* | Log. sin *D* | Log. cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Nov. 12 | *b* Pleiadum | 5½ | + 6 | —66 | 3 5.0 | +10 57 9 | —0.6924 | 0.5837 | +.1827 | +9.6035 | 9.9618 |
| 12 | ι Tauri | 5 | —15 | —66 | 3 12.2 | — 8 55 56 | —1.0207 | .5821 | +.1827 | +9.6096 | .9607 |
| 12 | *c* Pleiadum | 5 | — 5 | —66 | 3 26.6 | — 8 42 6 | —0.8806 | .5829 | +.1828 | +9.6079 | .9610 |
| 12 | *d* Pleiadum | 5 | +21 | —53 | 3 38.8 | — 8 30 25 | —0.4308 | .5849 | +.1827 | +9.6007 | .9624 |
| 12 | η Tauri | 3 | +17 | —58 | 4 5.3 | — 8 4 57 | —0.5066 | .5892 | +.1814 | +9.5858 | .9651 |
| 12 | *f* Pleiadum | 4½ | +26 | —48 | 4 44.2 | — 7 27 39 | —0.3457 | .5860 | +.1791 | +9.6027 | .9620 |
| 12 | *h* Pleiadum | 5½ | +21 | —53 | 4 44.6 | — 7 27 13 | —0.4265 | .5856 | +.1791 | +9.6042 | .9617 |
| 12 | 33 Tauri | 6 | +90 | +28 | 7 47.3 | — 4 32 0 | +1.0356 | .5940 | +.1724 | +9.5876 | .9648 |
| 12 | χ Tauri | 5½ | +47 | —25 | 17 24.9 | + 4 41 53 | +0.0397 | .5947 | +.1431 | +9.6306 | .9563 |
| 13 | β Tauri | 2 | + 7 | —57 | 17 3.7 | + 3 21 13 | —0.6588 | .5961 | +.0661 | +9.6784 | .9440 |
| 13 | B.A.C. 1772 | 6 | —19 | —61 | 21 52.1 | + 7 57 26 | —1.0257 | .5936 | +.0493 | +9.6874 | .9413 |
| 14 | 136 Tauri | 5 | +90 | +23 | 3 7.0 | —11 0 54 | +0.7660 | .6026 | +.0324 | +9.6655 | .9477 |
| 14 | κ Aurigæ | 4 | —24 | —61 | 11 18.3 | — 3 10 13 | —1.0752 | .5898 | +.0577 | +9.6930 | .9395 |
| 14 | 49 Aurigæ | 5½ | +65 | + 1 | 18 49.1 | + 4 1 57 | +0.3206 | .5944 | —.0172 | +9.6785 | .9454 |
| 14 | 54 Aurigæ | 6 | +46 | —15 | 20 28.0 | + 5 36 47 | +0.0233 | .5916 | —.0236 | +9.6770 | .9444 |
| 14 | 28 Geminor. | 6 | 0 | —61 | 22 26.1 | + 7 30 3 | —0.7743 | .5860 | —.0300 | +9.6871 | .9413 |
| 15 | 47 Geminor. | 6 | +90 | +24 | 8 47.7 | — 6 33 32 | +0.8262 | .5882 | —.0611 | +9.6584 | .9496 |
| 15 | 53 Geminor. | 6 | +23 | —40 | 10 33.6 | — 4 51 47 | —0.3769 | .5801 | —.0670 | +9.6736 | .9454 |
| 15 | 59 Geminor. | 6½ | +21 | —44 | 13 58.1 | — 1 34 22 | —0.4217 | .5764 | —.0787 | +9.6703 | .9463 |
| 15 | ι Geminor. | 4 | +11 | —55 | 14 26.4 | — 1 8 10 | —0.5964 | .5758 | —.0787 | +9.6727 | .9457 |
| 15 | $b^1$ Geminor. | 5½ | —21 | —62 | 15 51.9 | + 0 13 59 | —1.0566 | .5712 | —.0843 | +9.6774 | .9443 |
| 15 | $b^2$ Geminor. | 5½ | — 6 | —62 | 16 3.7 | + 0 25 16 | —0.8628 | .5724 | —.0843 | +9.6746 | .9451 |
| 15 | B.A.C. 2472 | 6 | — 8 | —62 | 16 24.1 | + 0 44 51 | —0.8930 | .5752 | —.0843 | +9.6746 | .9451 |
| 15 | υ Geminor. | 5 | +42 | —24 | 18 32.5 | + 2 48 16 | —0.0438 | .5750 | —.0902 | +9.6602 | .9490 |
| 15 | *c* Geminor. | 6 | +90 | +17 | 21 53.2 | + 6 1 15 | +0.7713 | .5748 | —.1009 | +9.6438 | .9532 |
| 16 | φ Geminor. | 5 | + 6 | —62 | 1 42.3 | + 9 41 42 | —0.6832 | .5661 | —.1090 | +9.6590 | ,9494 |
| 16 | $\omega^1$ Cancri | 6 | +68 | — 6 | 4 49.1 | —11 18 35 | +0.3744 | .5682 | —.1168 | +9.6385 | .9545 |
| 16 | $\omega^2$ Cancri | 6½ | +90 | + 8 | 5 9.7 | —10 58 45 | +0.6498 | .5678 | —.1192 | +9.6336 | .9555 |
| 16 | $\psi^1$ Cancri | 6½ | +11 | —59 | 8 42.2 | — 7 34 6 | —0.6071 | .5596 | —.1268 | +9.6459 | .9527 |
| 16 | $\psi^2$ Cancri | 4 | +29 | —40 | 8 48.9 | — 7 27 40 | —0.2816 | .5612 | —.1268 | +9.6409 | .9539 |
| 16 | λ Cancri | 6 | +90 | + 7 | 13 8.5 | — 3 17 36 | +0.6880 | .5598 | —.1379 | +9.6172 | .9591 |
| 16 | $\upsilon^1$ Cancri | 7 | +31 | —40 | 15 46.1 | — 0 45 37 | —0.2407 | .5542 | —.1432 | +9.6259 | .9573 |
| 16 | $\upsilon^2$ Cancri | 6½ | +47 | —26 | 16 37.3 | + 0 3 45 | +0.0404 | .5544 | —.1454 | +9.6179 | .9586 |
| 16 | B.A.C. 2840 | 7 | +31 | —40 | 17 4.6 | + 0 30 5 | —0.2383 | .5517 | —.1477 | +9.6230 | .9579 |
| 16 | $\upsilon^3$ Cancri | 6 | +36 | —36 | 18 19.4 | + 1 43 10 | —0.1525 | .5513 | —.1498 | +9.6187 | .9588 |
| 16 | 32 Cancri | 7 | +34 | —38 | 18 32.3 | + 1 54 35 | —0.1936 | .5389 | —.1498 | +9.6188 | .9588 |
| 17 | ξ Cancri | 5 | — 5 | —68 | 10 57.8 | — 6 13 47 | —0.8742 | .5439 | —.1831 | +9.5851 | .9652 |
| 17 | 79 Cancri | 6 | — 7 | —68 | 11 25.5 | — 5 47 2 | —0.9086 | .5442 | —.1832 | +9.5843 | .9654 |
| 17 | B.A.C. 3138 | 6 | +20 | —56 | 12 58.0 | — 4 17 32 | —0.4490 | .5311 | —.1867 | +9.5713 | .5675 |
| 18 | η Leonis | 3½ | —20 | —73 | 15 21.1 | — 2 44 12 | —1.1327 | .5064 | —.2228 | +9.4771 | .9795 |
| 18 | 37 Leonis | 6 | +90 | +18 | 20 12.9 | + 1 58 56 | +1.0402 | .5065 | —.2278 | +9.3968 | .9861 |
| 18 | 42 Leonis | 6 | — 6 | —75 | 22 53.1 | + 4 34 28 | —0.9353 | .5013 | —.2314 | +9.4323 | .9835 |
| 19 | B.A.C. 3579 | 6 | —18 | —75 | 2 33.9 | + 8 8 49 | —1.1148 | .4996 | —.2344 | +9.4149 | .9848 |
| 19 | *i* Leonis | 6 | —37 | —75 | 4 21.5 | + 9 53 21 | —1.3167 | .4977 | —.2362 | +9.4093 | .9852 |
| 19 | *l* Leonis | 5 | +66 | —22 | 13 33.5 | — 5 10 20 | +0.3724 | .4954 | —.2433 | +9.2922 | .9915 |
| 20 | B.A.C. 3837 | 6½ | +28 | —60 | 3 13.5 | + 8 7 4 | —0.3174 | .4875 | —.2519 | +9.1868 | .9948 |
| 20 | σ Leonis | 4 | +90 | + 4 | 7 13.7 | —11 59 14 | +0.9051 | .4870 | —.2536 | +9.0743 | .9969 |
| 21 | β Virginis | 3½ | +90 | +32 | 23 57.3 | + 4 17 33 | +1.2975 | .4819 | —.2590 | +8.6520 | .9996 |
| 21 | B.A.C. 4043 | 6½ | +90 | +47 | 4 49.5 | + 9 2 5 | +1.4109 | .4814 | —.2598 | +8.3651 | 9.9999 |
| 21 | 13 Virginis | 6 | +41 | —48 | 16 7.3 | — 3 57 48 | —0.0682 | .4799 | —.2605 | +6.2394 | 0.0000 |
| 21 | η Virginis | 3½ | +25 | —68 | 16 50.5 | — 3 15 45 | —0.3890 | .4799 | —.2605 | +7.2284 | 0.0000 |
| 22 | B.A.C. 4255 | 6½ | +87 | + 3 | 3 40.9 | + 7 17 40 | +0.9109 | .4802 | —.2595 | —8.7959 | 9.9992 |
| 23 | *h* Virginis | 6 | +20 | —71 | 10 29.1 | —10 43 11 | —0.4484 | .4889 | —.2476 | —9.2142 | .9941 |
| 23 | 86 Virginis | 6 | +61 | —28 | 17 38.9 | — 3 45 2 | +0.3260 | .4907 | —.2429 | —9.3073 | .9909 |
| 24 | B.A.C. 4679 | 6½ | +72 | — 4 | 3 42.8 | + 6 2 6 | +0.7754 | 0.4951 | —.2348 | —9.3922 | 9.9864 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Nov. 28 | B.A.C. 6120 | 6½ | +25 | —40 | 20 40.6 | — 4 42 33 | +0.0792 | 0.5653 | —.0158 | —9.6782 | 9.9440 |
| 28 | B.A C. 6127 | 5 | +19 | —40 | 21 13.2 | — 4 11 9 | +0.0702 | .5657 | —.0130 | —9.6782 | .9440 |
| 29 | B.A.C. 6190 | 6½ | +30 | —28 | 1 5.8 | — 0 27 15 | +0.2825 | .5657 | —.0017 | —9.6814 | .9431 |
| 29 | B.A.C. 6191 | 6½ | + 8 | —51 | 1 6.1 | — 0 27 0 | —0.1140 | .5677 | —.0017 | —9.6762 | .9446 |
| 29 | B.A.C. 6220 | 6½ | +18 | —41 | 3 1.4 | + 1 24 1 | +0.0677 | .5670 | +.0040 | —9.6789 | .9439 |
| 29 | φ Sagittarii | 3½ | —56 | —90 | 12 53.6 | +10 54 4 | —1.2241 | .5757 | +.0326 | —9.6590 | .9494 |
| 29 | τ Sagittarii | 3½ | +17 | —47 | 21 43.4 | — 4 35 58 | —0.0391 | .5675 | +.0551 | —9.6699 | .9464 |
| 30 | B.A.C. 6628 | 6 | +62 | — 3 | 5 1.9 | + 2 26 12 | +0.7247 | .5625 | +.0775 | —9.6736 | .9454 |
| 30 | B.A.C. 6666 | 6 | +21 | —45 | 7 17.7 | + 4 36 59 | —0.0118 | .5656 | +.0829 | —9.6612 | .9488 |
| 30 | ω Sagittarii | 5½ | +47 | —21 | 18 13.5 | — 8 51 31 | +0.4166 | .5600 | +.1124 | —9.6522 | .9511 |
| 30 | A Sagittarii | 5 | +50 | —18 | 19 32.6 | — 7 34 24 | +0.4667 | .5587 | +.1148 | —9.6508 | .9515 |
| Dec. 1 | B.A.C. 7077 | 6 | +65 | +32 | 10 6.6 | + 6 26 53 | +1.1926 | .5502 | +.1523 | —9.6328 | .9557 |
| 1 | B.A.C. 7197 | 6 | +30 | —45 | 16 54.1 | —11 0 8 | —0.0023 | .5518 | +.1683 | —9.5965 | .9632 |
| 2 | B.A.C. 7335 | 6 | +33 | —43 | 1 50.8 | — 2 22 22 | +0.0206 | .5481 | +.1855 | —9.5692 | .9679 |
| 2 | 27 Capricor. | 6 | — 3 | —82 | 2 17.5 | — 1 56 34 | —0.5632 | .5505 | +.1855 | —9.5569 | .9698 |
| 2 | φ Capricor. | 6 | +37 | —41 | 5 0.6 | + 0 20 51 | +0.0745 | .5458 | +.1937 | —9.5591 | .9694 |
| 2 | 33 Capricor. | 6 | +69 | +16 | 8 50.0 | + 4 22 20 | +1.0491 | .5410 | +.1996 | —9.5633 | .9688 |
| 2 | 37 Capricor. | 6 | +70 | +37 | 13 41.1 | + 9 3 24 | +1.2747 | .5381 | +.2089 | —9.5488 | .9710 |
| 2 | ι Capricor. | 4½ | +70 | + 2 | 14 42.2 | +10 2 29 | +0.8496 | .5389 | +.2107 | —9.5363 | .9727 |
| 2 | κ Capricor. | 5 | +70 | — 2 | 17 14.7 | —11 30 12 | +0.7805 | .5375 | +.2161 | —9.5239 | .9743 |
| 3 | 29 Aquarii | 6 | +73 | + 4 | 2 23.3 | — 2 40 1 | +0.8886 | .5335 | +.2308 | —9.4818 | .9791 |
| 3 | 45 Aquarii | 6 | —18 | —90 | 10 9.6 | + 4 50 48 | —1.0228 | .5351 | +.2425 | —9.3843 | .9869 |
| 3 | 50 Aquarii | 6 | +31 | —53 | 12 42.7 | + 7 18 53 | —0.1584 | .5322 | +.2452 | —9.3913 | .9864 |
| 3 | B.A.C. 7835 | 6½ | +34 | —52 | 15 20.6 | + 9 51 33 | —0.1329 | .5190 | +.2492 | —9.3728 | .9876 |
| 4 | 70 Aquarii | 6 | +26 | —61 | 0 8.2 | — 5 37 55 | —0.2929 | .5284 | +.2597 | —9.2926 | .9915 |
| 4 | 74 Aquarii | 6 | +78 | +54 | 2 30.2 | — 3 20 32 | +1.4148 | .5249 | +.2618 | —9.3311 | .9898 |
| 4 | $h^1$ Aquarii | 6 | —18 | —90 | 8 7.2 | + 2 5 40 | —1.0998 | .5276 | +.2676 | —9.1679 | .9952 |
| 4 | $h^2$ Aquarii | 7 | —12 | —90 | 8 11.9 | + 2 10 14 | —1.0174 | .5276 | +.2675 | —9.1710 | .9952 |
| 4 | $h^3$ Aquarii | 7 | + 3 | —90 | 8 28.2 | + 2 25 56 | —0.7584 | .5272 | +.2675 | —9.1801 | .9950 |
| 4 | $h^4$ Aquarii | 7½ | — 1 | —90 | 9 6.5 | + 3 3 3 | —0.8362 | .5268 | +.2684 | —9.1678 | .9952 |
| 4 | χ Aquarii | 5½ | +69 | —21 | 13 44.8 | + 7 32 24 | +0.4593 | .5247 | +.2717 | —9.1699 | .9952 |
| 5 | 22 Piscium | 6 | +13 | —81 | 4 45.0 | — 1 56 5 | —0.5828 | .5248 | +.2810 | —8.7718 | .9992 |
| 5 | 24 Piscium | 6½ | +84 | —11 | 7 9.4 | + 0 23 42 | +0.6612 | .5231 | +.2823 | —8.8379 | .9980 |
| 5 | B.A.C. 8365 | 6½ | +26 | —65 | 13 0.3 | + 6 3 28 | —0.3648 | .5252 | +.2841 | —8.3547 | .9999 |
| 5 | JUPITER | | +56 | —34 | 14 19.0 | + 7 19 36 | +0.2002 | .5172 | +.2798 | —8.4139 | .9999 |
| 5 | B A.C. 57 | 6½ | + 1 | —89 | 19 6.5 | +11 57 56 | —0.8375 | .5261 | +.2851 | +8.1929 | .9999 |
| 5 | 44 Piscium | 6 | +42 | —47 | 22 45.5 | — 8 30 9 | —0.0531 | .5268 | +.2852 | +8.3019 | .9999 |
| 6 | B.A.C. 221 | 6 | +25 | —66 | 9 35.2 | + 1 58 34 | —0.3831 | .5313 | +.2841 | +8.8991 | .9996 |
| 6 | B.A C. 274 | 6½ | +44 | —42 | 15 0.8 | + 7 13 29 | —0.0136 | .5328 | +.2821 | +8.9979 | .9978 |
| 6 | ι Piscium | 4 | —10 | —83 | 16 27.7 | + 8 37 30 | —1.0167 | .5320 | +.2816 | +9.0932 | .9966 |
| 6 | ζ Piscium | 6 | +90 | — 8 | 21 27.1 | —10 32 57 | +0.6844 | .5364 | +.2792 | +9.0746 | .9969 |
| 7 | π Piscium | 5 | — 7 | —79 | 8 6.1 | — 0 15 26 | —0.9681 | .5407 | +.2712 | +9.2963 | .9913 |
| 8 | 27 Arietis | 6 | +17 | —66 | 7 36.9 | — 1 34 16 | —0.5284 | .5571 | +.2430 | +9.4677 | .9804 |
| 8 | 40 Arietis | 6 | +85 | — 5 | 15 1.3 | + 6 33 51 | +0.6070 | .5675 | +.2293 | +9.4826 | .9790 |
| 8 | $\varrho^2$ Arietis | 6 | +90 | +37 | 18 2.5 | + 8 28 15 | +1.2306 | .5720 | +.2236 | +9.4841 | .9788 |
| 8 | 47 Arietis | 6 | — 5 | —70 | 18 55.5 | + 9 19 15 | —0.9026 | .5643 | +.2216 | +9.5360 | .9727 |
| 9 | δ Arietis | 4½ | +90 | +36 | 0 29.0 | — 9 19 52 | +1.2073 | .5769 | +.2113 | +9.5167 | .9752 |
| 9 | ζ Arietis | 4½ | +54 | —25 | 1 47.7 | — 8 4 13 | +0.1597 | .5731 | +.2091 | +9.5447 | .9715 |
| 9 | $\tau^1$ Arietis | 5 | +82 | — 4 | 4 20.2 | — 5 37 35 | +0.5653 | .5767 | +.2025 | +9.5470 | .9712 |
| 9 | $\tau^2$ Arietis | 6 | +90 | +28 | 4 57.8 | — 5 1 25 | +1.0912 | .5789 | +.2002 | +9.5388 | .9723 |
| 9 | 65 Arietis | 6 | +90 | +34 | 5 37.8 | — 4 22 57 | +1.1588 | .5805 | +.2002 | +9.5401 | .9722 |
| 9 | 9 Tauri | 6 | +27 | —48 | 10 33.8 | + 0 21 30 | —0.3149 | .5794 | +.1884 | +9.5872 | .9649 |
| 9 | *g* Pleiadum | 5½ | — 3 | —66 | 13 37.3 | + 3 17 43 | —0.8484 | .5791 | +.1808 | +9.6066 | .9613 |
| 9 | *b* Pleiadum | 5½ | + 8 | —66 | 13 39.2 | + 3 19 34 | —0.6677 | .5798 | +.1809 | +9.6035 | .9618 |
| 9 | ι Tauri | 5 | —13 | —66 | 13 46.5 | + 3 26 35 | —0.9986 | 0.5785 | +.1805 | +9.6096 | 9.9607 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. |  | Washington Mean Time of ☌. | At Washington Mean Time of Conjunction. |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Northern. | Southern. |  | *H* | *Y* | *p′* | *q′* | Log sin *D* | Log cos *D* |
|  |  |  | ° | ° | h. m. | h. m. s. |  |  |  |  |  |
| Dec. 9 | *c* Pleiadum | 5 | — 4 | —66 | 14 1.2 | + 3 40 39 | —0.8578 | 0.5793 | +.1793 | +9.6079 | 9.9610 |
| 9 | B.A.C. 1155 | 7 | +67 | —12 | 14 2.6 | + 3 41 59 | +0.3616 | .5847 | +.1798 | +9.5865 | .9650 |
| 9 | *k* Pleiadum | 7½ | —17 | —66 | 14 2.9 | + 3 42 16 | —1.0392 | .5785 | +.1793 | +9.6111 | .9604 |
| 9 | *l* Pleiadum | 7 | —14 | —66 | 14 6.2 | + 3 45 27 | —1.0030 | .5786 | +.1787 | +9.6107 | .9604 |
| 9 | *d* Pleiadum | 5 | +22 | —52 | 14 13.5 | + 3 52 29 | —0.4050 | .5817 | +.1783 | +9.6007 | .9624 |
| 9 | 12 Pleiadum | 7½ | — 9 | —66 | 14 28.3 | + 4 6 42 | —0.9322 | .5792 | +.1783 | +9.6106 | .9604 |
| 9 | *p* Pleiadum | 7½ | +17 | —57 | 14 37.3 | + 4 15 17 | —0.5046 | .5813 | +.1778 | +9.6037 | .9618 |
| 9 | η Tauri | 3 | +18 | —56 | 14 40.5 | + 4 18 21 | —0.4841 | .5813 | +.1778 | +9 6035 | .9618 |
| 9 | 28 Pleiadum | 7 | +60 | —17 | 15 1.1 | + 4 38 13 | +0.2551 | .5853 | +.1768 | +9.5916 | .9641 |
| 9 | *s* Pleiadum | 7½ | +37 | —37 | 15 14.9 | + 4 51 26 | —0.1408 | .5833 | +.1760 | +9.5992 | .9627 |
| 9 | *f* Pleiadum | 4½ | +27 | —47 | 15 19.8 | + 4 56 10 | —0.3218 | .5825 | +.1755 | +9.6027 | .9620 |
| 9 | *h* Pleiadum | 5½ | +23 | —51 | 15 20.2 | + 4 56 33 | —0.4034 | .5821 | +.1755 | +9.6042 | .9617 |
| 9 | 34 Pleiadum | 7½ | +48 | —27 | 15 33.5 | + 5 9 14 | +0.0564 | .5844 | +.1750 | +9.5968 | .9631 |
| 9 | 40 Pleiadum | 7½ | +38 | —36 | 16 0.0 | + 5 34 43 | —0.1179 | .5847 | +.1732 | +9.6012 | .9623 |
| 9 | 33 Tauri | 6 | +90 | +30 | 18 25.4 | + 7 54 18 | +1.0622 | .5909 | +.1682 | +9.5876 | .9648 |
| 10 | χ Tauri | 5½ | +47 | —24 | 4 9.1 | — 6 45 43 | +0.0391 | .5931 | +.1396 | +9.6306 | .9563 |
| 11 | β Tauri | 2 | + 4 | —61 | 3 51.9 | — 8 2 20 | —0.7074 | .5972 | +.0634 | +9 6784 | .9440 |
| 11 | B.A.C. 1772 | 6 | —24 | —61 | 8 39.4 | — 3 27 3 | —1.0859 | .5951 | +.0500 | +9.6874 | .9413 |
| 11 | 136 Tauri | 5 | +90 | +19 | 13 52.6 | + 1 32 53 | +0.6920 | .6053 | +.0298 | +9.6655 | .9476 |
| 11 | κ Aurigæ | 4 | —33 | —61 | 21 59.9 | + 9 19 40 | —1.1620 | .5935 | —.0000 | +9.6930 | .9395 |
| 12 | 49 Aurigæ | 5½ | +58 | — 5 | 5 25.9 | — 7 33 2 | +0.2138 | .5990 | —.0206 | +9.6735 | .9454 |
| 12 | 54 Aurigæ | 6 | +40 | —21 | 7 3.6 | — 5 59 25 | —0.0849 | .5962 | —.0271 | +9.6771 | .9444 |
| 12 | 28 Geminor. | 6 | — 8 | —61 | 9 0.2 | — 4 7 43 | —0.8822 | .5906 | —.0336 | +9.6871 | .9413 |
| 12 | 47 Geminor. | 6 | +90 | +16 | 19 12.6 | + 5 39 34 | +0.6879 | .5932 | —.0653 | +9.6584 | .9496 |
| 12 | 53 Geminor. | 6 | +16 | —49 | 20 56.8 | + 7 19 33 | —0.5101 | .5852 | —.0715 | +9.6736 | .9453 |
| 13 | ι Geminor. | 4 | + 2 | —62 | 0 45.6 | +10 59 10 | —0.7355 | .5822 | —.0805 | +9.6728 | .9456 |
| 13 | *b*¹ Geminor. | 5½ | —36 | —62 | 2 9.7 | —11 40 10 | —1.1943 | .5777 | —.0863 | +9.6774 | .9442 |
| 13 | *b*² Geminor. | 5½ | —16 | —62 | 2 21.2 | —11 29 5 | —1.0035 | .5790 | —.0863 | +9.6746 | .9451 |
| 13 | B.A.C. 2472 | 6 | —19 | —62 | 2 41.2 | —11 9 54 | —1.0340 | .5793 | —.0865 | +9 6746 | .9451 |
| 13 | υ Geminor. | 5 | +33 | —33 | 4 47.2 | — 9 8 51 | —0.1947 | .5820 | —.0923 | +9.6602 | .9490 |
| 13 | *c* Geminor. | 6 | +88 | + 8 | 8 4.2 | — 5 59 39 | +0.6078 | .5818 | —.1035 | +9.6438 | .9532 |
| 13 | φ Geminor. | 5 | — 4 | —63 | 11 48.9 | — 2 23 39 | —0.8424 | .5728 | —.1118 | +9 6590 | .9494 |
| 13 | ω¹ Cancri | 6 | +56 | —15 | 14 51.9 | + 0 32 20 | +0.2005 | .5741 | —.1211 | +9.6385 | .9545 |
| 13 | ψ² Cancri | 4 | +19 | —51 | 18 46.8 | + 4 18 18 | —0.4574 | .5681 | —.1301 | +9.6409 | .9539 |
| 13 | λ Cancri | 6 | +76 | — 3 | 23 0.7 | + 8 22 43 | +0.4787 | .5664 | —.1423 | +9.6172 | .9591 |
| 14 | υ³ Cancri | 6 | +29 | —43 | 3 39.6 | —11 8 42 | —0.2808 | .5598 | —.1517 | +9.6187 | .9588 |
| 14 | ξ¹ Cancri | 5 | —20 | —68 | 20 21.3 | + 4 57 42 | —1.0884 | .5389 | —.1863 | +9.6851 | .9652 |
| 14 | 79 Cancri | 6 | —24 | —68 | 20 48.3 | + 5 23 48 | —1.1228 | .5434 | —.1863 | +9.5641 | .9687 |
| 14 | B.A.C. 3138 | 6 | + 8 | —68 | 22 18.8 | + 6 51 14 | —0.6645 | .5405 | —.1898 | +9.5607 | .9692 |
| 16 | η Leonis | 3½ | —56 | —73 | 0 7.5 | + 7 50 6 | —1.3852 | .5156 | —.2269 | +9.4462 | .9824 |
| 16 | 37 Leonis | 6 | +90 | 0 | 4 53.5 | —11 32 37 | +0.7667 | .5112 | —.2322 | +9.4174 | .9846 |
| 16 | 42 Leonis | 6 | —26 | —75 | 7 30.6 | — 9 0 12 | —1.1967 | .5104 | —.2342 | +9.3988 | .9859 |
| 16 | B.A C 3597 | 6 | —49 | —75 | 11 7.1 | — 5 30 8 | —1.3782 | .5068 | —.2378 | +9.3791 | .9872 |
| 16 | *l* Leonis | 5 | +49 | —37 | 21 55.0 | + 4 58 58 | +0.0871 | .4988 | —.2464 | +9.2957 | .9913 |
| 17 | χ Leonis | 5 | +90 | +58 | 6 28.6 | —10 41 57 | +1.4243 | .4964 | —.2511 | +9.1494 | .9956 |
| 17 | B.A.C. 3837 | 6½ | +13 | —78 | 11 22.3 | — 5 56 21 | —0.6047 | .4917 | —.2537 | +9.1529 | .9956 |
| 17 | σ Leonis | 4 | +83 | —12 | 15 19.3 | — 2 5 55 | +0.6074 | .4895 | —.2554 | +9.1143 | .9963 |
| 18 | β Virginis | 3½ | +90 | + 9 | 7 51.4 | —10 0 33 | +0.9965 | .4836 | —.2596 | +8.7826 | .9992 |
| 18 | B.A.C. 4043 | 6½ | +90 | +16 | 12 41.0 | — 5 18 39 | +1.1112 | .4826 | —.2604 | +8.6021 | 9.9997 |
| 19 | 13 Virginis | 6 | +26 | —65 | 23 53.9 | + 5 36 29 | —0.3566 | .4807 | —.2604 | +7.7278 | 0.0000 |
| 19 | η Virginis | 3½ | +10 | —89 | 0 36.8 | + 6 18 17 | —0.6751 | .4808 | —.2604 | +7.9755 | 0.0000 |
| 19 | B.A.C. 4255 | 6½ | +83 | —13 | 11 24.1 | — 7 11 31 | +0.6259 | .4807 | —.2588 | —8.7365 | 9.9994 |
| 20 | B.A.C. 4394 | 5½ | +82 | +48 | 4 24.1 | + 9 21 38 | +1.3993 | .4832 | —.2500 | —9.0896 | .9967 |
| 20 | *h* Virginis | 6 | + 7 | —90 | 18 8.8 | — 1 15 46 | —0.6921 | .4877 | —.2454 | —9.2392 | .9934 |
| 21 | 86 Virginis | 6 | +47 | —39 | 1 18.5 | + 5 42 15 | +0.1107 | 0.4907 | —.2406 | —9.3073 | 9.9909 |

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | Limiting Parallels. | | Washington Mean Time of δ. | At Washington Mean Time of Conjunction. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Northern. | Southern. | | *H* | *Y* | *p'* | *q'* | Log sin *D* | Log. cos *D* |
| | | | ° | ° | h. m. | h. m. s. | | | | | |
| Dec. 21 | B.A.C. 4679 | 6½ | +70 | —15 | 11 22.7 | — 8 30 22 | +0.5587 | 0.4945 | —.2323 | —9.3922 | 9 9864 |
| 21 | B.A.C. 4700 | 5½ | +75 | +31 | 14 47.4 | — 5 11 25 | +1.2569 | .4944 | —.2295 | —9.4303 | .9837 |
| 23 | B.A.C. 5023 | 6 | +68 | +20 | 0 20.6 | + 3 22 15 | +1.0990 | .5171 | —.1866 | —9.5711 | .9676 |
| 23 | 42 Libræ | 5½ | +66 | — 7 | 11 50.6 | — 9 29 37 | +0.6837 | .5264 | —.1680 | —9.5981 | .9629 |
| 23 | B.A.C. 5197 | 6 | +66 | +38 | 14 26.5 | — 6 58 47 | +1.2563 | .5270 | —.1625 | —9.6138 | .9598 |
| 23 | B.A.C. 5253 | 6 | +55 | —18 | 18 13.7 | — 3 18 59 | +0.4787 | .5330 | —.1548 | —9.6110 | .9604 |
| 23 | B.A.C. 5254 | 6 | +23 | —52 | 18 15.5 | — 3 17 11 | —0.1332 | .5353 | —.1548 | —9.6016 | .9622 |
| 23 | 3 Scorpii | 6 | +65 | +33 | 18 33.8 | — 2 59 32 | +1.2081 | .5300 | —.1548 | —9.6230 | .9579 |
| 23 | B.A.C. 5286 | 6½ | +55 | —17 | 20 23.7 | — 1 13 16 | +0.4975 | .5346 | —.1509 | —9.6163 | .9593 |
| 24 | σ Scorpii | 3½ | +24 | —47 | 6 41.4 | + 8 43 42 | —0.0520 | .5444 | —.1300 | —9.6299 | .9564 |
| 24 | α Scorpii | 1½ | +49 | —20 | 10 20.9 | —11 44 24 | +0.4302 | .5456 | —.1210 | —9.6436 | .9533 |
| 24 | 22 Scorpii | 5 | —32 | —90 | 10 44.5 | —11 21 35 | —1.0445 | .5516 | —.1210 | —9.6227 | .9580 |
| 28 | 17 Capricor. | 6 | —36 | —90 | 22 0.6 | — 4 4 44 | —1.2428 | .5630 | +.1696 | —9.5742 | .9671 |
| 28 | B A.C. 7197 | 6 | +40 | —34 | 22 55.1 | — 3 11 42 | +0.1898 | .5567 | +.1719 | —9.5964 | .9632 |
| 29 | B.A.C. 7335 | 6 | +44 | —32 | 7 44.0 | + 5 18 18 | +0.2311 | .5527 | +.1893 | —9.5692 | .9679 |
| 29 | 27 Capricor. | 6 | +15 | —65 | 8 10.4 | + 5 43 45 | —0.3484 | .5551 | +.1919 | —9.5568 | .9698 |
| 29 | φ Capricor. | 6 | +48 | —29 | 10 51.3 | + 8 18 56 | +0.2909 | .5508 | +.1954 | —9.5591 | .9694 |
| 29 | 33 Capricor. | 6 | +69 | +37 | 14 37.8 | +11 57 29 | +1.2685 | .5450 | +.2033 | —9.5633 | .9688 |
| 29 | ι Capricor. | 4½ | +70 | +18 | 20 25.8 | — 6 26 32 | +1.0822 | .5420 | +.2145 | —9.5363 | .9727 |
| 29 | κ Capricor. | 5 | +71 | +13 | 22 56.7 | — 4 0 52 | +1.0167 | .5405 | +.2197 | —9.5239 | .9743 |
| 30 | δ Capricor. | 4½ | —55 | —90 | 0 57.7 | — 2 4 0 | —1.4595 | .5465 | +.2392 | —9.4603 | .9811 |
| 30 | 29 Aquarii | 6 | +73 | +21 | 8 0.3 | + 4 44 18 | +1.1413 | .5357 | +.2342 | —9.4817 | .9791 |
| 30 | 50 Aquarii | 6 | +45 | —38 | 18 15.7 | — 9 20 47 | +0.1137 | .5337 | +.2482 | —9.3914 | .9864 |
| 30 | B.A.C. 7835 | 6½ | +47 | —37 | 20 52.9 | — 6 18 45 | +0.1430 | .5321 | +.2519 | —9.3729 | .9876 |
| 31 | 70 Aquarii | 6 | +41 | —45 | 5 39.3 | + 1 40 31 | —0.0060 | .5295 | +.2606 | —9.2926 | .9915 |
| 31 | $h^1$ Aquarii | 6 | + 1 | —90 | 13 38.6 | + 9 24 22 | —0.8050 | .5277 | +.2680 | —9.1680 | .9952 |
| 31 | $h^2$ Aquarii | 7 | + 5 | —90 | 13 43.5 | + 9 29 5 | —0.7219 | .5277 | +.2680 | —9.1710 | .9952 |
| 31 | $h^3$ Aquarii | 7 | +19 | —72 | 13 59.7 | + 9 44 48 | —0.4624 | .5268 | +.2687 | —9.1800 | .9950 |
| 31 | $h^4$ Aquarii | 7½ | +15 | —77 | 14 38.1 | +10 21 59 | —0.5396 | .5269 | +.2687 | —9.1680 | .9952 |
| 31 | φ Aquarii | 5 | —33 | —90 | 18 3.8 | —10 18 54 | —1.2880 | .5265 | +.2717 | —9.0747 | .9969 |
| 31 | χ Aquarii | 5½ | +78 | — 5 | 19 15.9 | — 9 9 6 | +0.7616 | 0.5236 | +.2726 | —9.1797 | 9.9950 |

NOTE. — B. A. C., British Association Catalogue.

## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1856.

| Date. | Star's Name. | Magnitude. | IMMERSION. | | | | EMERSION. | | | | Duration of Occultation. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Washington | | Angle from | | Washington | | Angle from | | |
| | | | Sidereal Time. | Mean Time. | North Point. | Vertex. | Sidereal Time. | Mean Time. | North Point. | Vertex. | |
| | | | h. m. | h. m. | ° | ° | h. m. | h. m. | ° | ° | h. m |
| Jan. 11 | $\psi^1$ Aquarii | 4½ | 23 23 | 4 18 | 350 | 358 | 0 19 | 5 14 | 88 | 110 | 0 56 |
| 11 | $\psi^2$ Aquarii | 4½ | 0 35 | 5 13 | 255 | 276 | 1 18 | 5 55 | 181 | 210 | 0 42 |
| 13 | *e* Piscium | 5½ | 5 44 | 10 12 | 274 | 325 | 6 38 | 11 6 | 141 | 192 | 0 54 |
| 15 | $\pi$ Arietis | 5½ | 4 51 | 9 12 | 310 | 356 | 5 56 | 10 17 | 103 | 155 | 1 5 |
| 15 | $\varrho^3$ Arietis | 6 | 8 40 | 13 1 | 317 | 10 | 9 29 | 13 49 | 74 | 124 | 0 48 |
| 16 | B.A.C. 1189 | 7 | 8 18 | 12 35 | 270 | 327 | 9 20 | 13 37 | 112 | 156 | 1 2 |
| 16 | 32 Tauri* | 6 | 11 16 | 15 32 | 265 | 312 | 12 4 | 16 20 | 113 | 156 | 0 48 |
| 20 | *c* Geminor. | 6 | 11 36 | 15 36 | 242 | 302 | 12 33 | 16 34 | 79 | 137 | 0 57 |
| 21 | $\lambda$ Cancri | 6 | 1 21 | 5 19 | 204 | 154 | 1 46 | 5 44 | 148 | 97 | 0 26 |
| 21 | $\upsilon^3$ Cancri | 6 | 7 25 | 11 23 | 318 | 282 | 7 59 | 11 56 | 2 | 344 | 0 34 |
| Feb. 1 | 43 Ophiuchi | 6 | 14 10 | 17 27 | 183 | 148 | 14 37 | 17 53 | 140 | 109 | 0 26 |
| 12 | 65 Arietis | 6 | 3 36 | 6 7 | 327 | 340 | 4 49 | 7 20 | 89 | 130 | 1 13 |
| 16 | 47 Geminor. | 6 | 3 14 | 5 29 | 164 | 104 | Star 0′.8 | south of | ☾'s | limb. | |
| 17 | $\lambda$ Cancri | 6 | 12 6 | 14 16 | 203 | 261 | 12 56 | 15 6 | 109 | 166 | 0 50 |
| 20 | *l* Leonis | 5 | 15 41 | 17 39 | 182 | 234 | 16 15 | 18 13 | 115 | 168 | 0 34 |
| 29 | B.A.C. 6072 | 6½ | 14 41 | 16 3 | 270 | 235 | 15 56 | 17 19 | 64 | 41 | 1 16 |
| Mar. 8 | 88 Piscium | 6½ | 5 17 | 6 10 | 293 | 342 | 6 17 | 7 9 | 125 | 176 | 1 0 |
| 10 | $\delta$ Arietis | 4½ | 8 44 | 9 28 | 277 | 331 | 9 39 | 10 23 | 111 | 162 | 0 55 |
| 14 | 47 Geminor. | 6 | 12 51 | 13 19 | 221 | 277 | 13 37 | 14 5 | 111 | 162 | 0 46 |
| 15 | $\omega^1$ Cancri | 6 | 10 2 | 10 26 | 222 | 278 | 11 13 | 11 37 | 93 | 153 | 1 11 |
| 31 | B.A C. 7550 | 6 | 18 36 | 17 56 | 318 | 284 | 19 44 | 19 4 | 89 | 66 | 1 8 |
| April 9 | 136 Tauri* | 5 | 13 31 | 12 17 | 302 | 346 | 14 10 | 12 56 | 51 | 92 | 0 39 |
| 10 | 54 Aurigæ | 6 | 7 48 | 6 30 | 353 | 45 | Star 0′.1 | north of | ☾'s | limb. | |
| 12 | $\upsilon^3$ Cancri | 6 | 6 56 | 5 31 | 243 | 195 | 8 27 | 7 1 | 78 | 81 | 1 31 |
| 12 | 32 Cancri | 7 | 7 56 | 6 30 | 269 | 248 | 9 19 | 7 53 | 44 | 79 | 1 23 |
| 22 | $\sigma$ Scorpii | 3½ | 13 36 | 11 31 | 281 | 251 | 14 41 | 12 35 | 26 | 7 | 1 4 |
| 22 | $\alpha$ Scorpii | 1½ | 19 13 | 17 6 | 241 | 274 | 20 25 | 18 18 | 102 | 145 | 1 12 |
| 23 | 43 Ophiuchi | 6 | 18 5 | 15 55 | 352 | 363 | Star 1′.5 | north of | ☾'s | limb. | |
| May 9 | $\lambda$ Cancri | 6 | 13 55 | 10 42 | 207 | 262 | 14 36 | 11 23 | 111 | 163 | 0 41 |
| 12 | *l* Leonis | 5 | 16 27 | 13 2 | 192 | 244 | 17 5 | 13 40 | 110 | 160 | 0 38 |
| 14 | 13 Virginis* | 6 | 18 54 | 15 21 | 250 | 301 | 19 47 | 16 14 | 59 | 108 | 0 54 |
| 16 | *h* Virginis | 6 | 10 36 | 6 56 | 208 | 171 | 11 46 | 8 7 | 73 | 49 | 1 11 |
| 21 | B.A.C. 6072 | 6½ | 14 37 | 10 37 | 283 | 247 | 15 47 | 11 47 | 52 | 27 | 1 10 |
| June 21 | B.A.C. 7550 | 6 | 19 2 | 13 0 | 241 | 210 | 19 48 | 13 45 | 171 | 148 | 0 46 |
| 25 | *e* Piscium† | 5½ | 18 32 | 12 14 | 280 | 229 | 19 23 | 13 5 | 139 | 87 | 0 51 |
| 25 | 88 Piscium | 6½ | 22 24 | 16 5 | 347 | 305 | 23 18 | 16 59 | 89 | 56 | 0 54 |
| 27 | $\varrho^3$ Arietis | 6 | 20 2 | 13 36 | 304 | 254 | 20 53 | 14 26 | 109 | 56 | 0 51 |
| July 10 | 86 Virginis | 6 | 14 56 | 7 39 | 236 | 254 | 16 21 | 9 4 | 54 | 88 | 1 25 |
| 16 | B.A.C. 6628 | 6 | 20 40 | 13 58 | 278 | 306 | 21 49 | 15 8 | 118 | 157 | 1 9 |
| 18 | 33 Capricor. | 6 | 20 52 | 13 3 | 300 | 295 | 22 10 | 14 21 | 120 | 132 | 1 19 |
| 21 | 29 Piscium | 5½ | 18 22 | 10 21 | 258 | 207 | 19 6 | 11 6 | 161 | 112 | 0 45 |
| Aug. 9 | B.A.C. 5253 | 6 | 17 59 | 8 44 | 291 | 318 | 19 5 | 9 50 | 39 | 77 | 1 7 |
| 9 | B.A.C. 5286* | 6½ | 20 42 | 11 27 | 270 | 318 | 21 46 | 12 30 | 74 | 124 | 1 4 |
| 13 | A Sagittarii | 5 | 23 19 | 13 47 | 343 | 21 | 0 1 | 14 29 | 62 | 106 | 0 42 |
| 15 | 29 Aquarii | 6 | 1 31 | 15 52 | 251 | 292 | 2 9 | 16 29 | 173 | 218 | 0 37 |
| 18 | JUPITER | | 22 56 | 13 5 | 269 | 240 | 23 50 | 13 59 | 173 | 159 | 0 54 |
| 21 | B.A.C. 1032 | 6½ | 21 30 | 11 28 | 255 | 201 | 22 14 | 12 9 | 159 | 104 | 0 41 |
| 21 | $\tau^2$ Arietis | 6 | 22 22 | 12 19 | 257 | 202 | 23 7 | 13 4 | 161 | 105 | 0 45 |
| 24 | B.A.C. 2097 | 6½ | 3 9 | 16 53 | 291 | 229 | 4 19 | 18 3 | 55 | 357 | 1 10 |
| 26 | $\lambda$ Cancri | 6 | 2 4 | 15 41 | 175 | 122 | Star 2′.5 | south of | ☾'s | limb. | |
| Sept 9 | B.A.C. 6628 | 6 | 20 59 | 9 42 | 6 | 27 | 21 14 | 9 57 | 27 | 51 | 0 15 |
| 11 | 33 Capricor. | 6 | 20 24 | 8 59 | 319 | 307 | 21 38 | 10 13 | 100 | 104 | 1 15 |
| 15 | ť Piscium | 6 | 2 4 | 14 23 | 287 | 307 | 3 12 | 15 30 | 148 | 184 | 1 8 |

## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1856.

| Date. | | Star's Name. | Magnitude. | IMMERSION. | | | | EMERSION | | | | Duration of Occultation. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Washington | | Angle from | | Washington | | Angle from | | |
| | | | | Sidereal Time. | Mean Time. | North Point. | Vertex. | Sidereal Time. | Mean Time. | North Point. | Vertex. | |
| | | | | h. m. | h. m. | ° | ° | h. m. | h. m. | ° | ° | h. m. |
| Sept. | 17 | $\rho^2$ Arietis | 6 | 20 27 | 8 38 | 239 | 187 | 20 54 | 9 5 | 175 | 122 | 0 27 |
| | 18 | 33 Tauri | 6 | 21 47 | 9 54 | 203 | 150 | Star 0′.4 | south of | ☾'s | limb. | |
| | 18 | 36 Tauri | 6½ | 0 43 | 12 50 | 271 | 213 | 1 47 | 13 53 | 143 | 90 | 1 3 |
| | 22 | $\omega^1$ Cancri † | 6 | 0 15 | 12 6 | 270 | 225 | 1 8 | 12 59 | 85 | 34 | 0 53 |
| | 22 | $\omega^2$ Cancri | 6½ | 1 3 | 12 54 | 177 | 127 | Star 1′.5 | south of | ☾'s | limb. | |
| Oct. | 2 | B.A.C. 5023 | 6 | 17 59 | 5 12 | 199 | 233 | 18 51 | 6 3 | 122 | 163 | 0 52 |
| | 7 | *b* Sagittarii | 5 | 19 5 | 5 58 | 237 | 228 | 20 1 | 6 54 | 157 | 160 | 0 56 |
| | 8 | B.A.C. 7237 | 6 | 17 51 | 4 40 | 247 | 213 | 18 51 | 5 40 | 150 | 126 | 1 0 |
| | 9 | 29 Aurigæ | 6 | 2 6 | 12 50 | 256 | 300 | 2 46 | 13 30 | 167 | 215 | 0 40 |
| | 14 | 40 Arietis | 6 | 8 22 | 18 45 | 212 | 266 | 8 36 | 18 59 | 182 | 235 | 0 15 |
| | 14 | $\tau^2$ Arietis * | 6 | 19 20 | 5 42 | 267 | 223 | 20 2 | 6 23 | 138 | 90 | 0 41 |
| | 15 | 65 Arietis † | 6 | 19 58 | 6 19 | 244 | 197 | 20 29 | 6 50 | 163 | 113 | 0 31 |
| | 15 | 28 Pleiadum | 7 | 7 46 | 18 5 | 276 | 334 | 8 48 | 19 7 | 107 | 163 | 1 2 |
| | 17 | B.A.C. 1746 | 6½ | 22 36 | 8 49 | 304 | 254 | 23 24 | 9 37 | 83 | 29 | 0 48 |
| | 18 | 49 Aurigæ* | 5½ | 22 6 | 8 16 | 5 | 323 | Star 2′.6 | north of | ☾'s | limb. | |
| Nov. | 5 | $\iota$ Capricor. | 4½ | 0 24 | 9 22 | 277 | 312 | 1 23 | 10 21 | 147 | 190 | 0 59 |
| | 11 | $\rho^2$ Arietis | 6 | 21 42 | 6 17 | 209 | 155 | Star 0′.6 | south of | ☾'s | limb. | |
| | 11 | $\zeta$ Arietis | 4½ | 7 49 | 16 22 | 315 | 10 | 8 20 | 17 13 | 75 | 129 | 0 51 |
| | 12 | 33 Tauri | 6 | 21 34 | 6 5 | 238 | 185 | 22 3 | 6 34 | 169 | 114 | 0 29 |
| | 15 | 47 Geminor.† | 6 | 22 59 | 7 28 | 229 | 187 | 23 35 | 8 3 | 135 | 89 | 0 35 |
| | 16 | $\upsilon^2$ Cancri | 6½ | 7 43 | 15 56 | 293 | 267 | 8 44 | 16 57 | 22 | 39 | 1 1 |
| | 19 | *l* Leonis† | 5 | 3 36 | 11 38 | 228 | 179 | 4 29 | 12 31 | 91 | 39 | 0 53 |
| | 21 | 13 Virginis† | 6 | 6 5 | 14 0 | 301 | 250 | 6 36 | 14 30 | 0 | 309 | 0 30 |
| | 23 | 86 Virginis† | 6 | 7 53 | 15 39 | 226 | 175 | 8 53 | 16 39 | 70 | 22 | 1 0 |
| | 30 | B.A.C. 6628 | 6 | 22 13 | 5 33 | 281 | 315 | 23 21 | 6 41 | 117 | 161 | 1 8 |
| Dec. | 5 | 24 Piscium | 6½ | 23 41 | 6 42 | 303 | 302 | 0 57 | 7 57 | 140 | 160 | 1 15 |
| | 8 | 40 Arietis* | 6 | 10 6 | 15 53 | 243 | 290 | 10 42 | 16 29 | 146 | 188 | 0 36 |
| | 9 | B.A.C. 1155 | 7 | 8 8 | 14 51 | 260 | 317 | 9 5 | 15 48 | 122 | 177 | 0 57 |
| | 9 | 28 Pleiadum | 7 | 9 13 | 15 56 | 297 | 351 | 10 6 | 16 49 | 82 | 134 | 0 52 |
| | 13 | *c* Geminor. | 6 | 23 55 | 6 24 | 254 | 209 | 0 44 | 7 13 | 103 | 53 | 0 49 |
| | 13 | $\omega^1$ Cancri | 6 | 7 59 | 14 26 | 263 | 268 | 9 18 | 15 46 | 56 | 105 | 1 20 |
| | 23 | B.A.C. 5253† | 6 | 10 33 | 16 20 | 240 | 191 | 11 36 | 17 23 | 66 | 22 | 1 3 |
| | 23 | B.A.C. 5286 | 6½ | 13 12 | 18 59 | 295 | 264 | 14 1 | 19 48 | 9 | 346 | 0 49 |

### NOTES.

* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

The *Angles of Position*, for the points of contact, are for direct vision, and are reckoned from the Moon's *North Point* and from its *Vertex* towards the West. For *inverted image*, add 180° to the angles given.

## WASHINGTON MEAN TIME.

### JANUARY.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| III. | Transit | Ingress W. | 1 | 6 | 58 | |
| III. | Transit | Egress | 1 | 10 | 37 | |
| III. | Shadow | Ingress | 1 | 11 | 11 | |
| III. | Shadow | Egress | 1 | 14 | 42 | |
| I. | Transit | Ingress | 1 | 17 | 36 | |
| I. | Shadow | Ingress | 1 | 18 | 38 | |
| I. | Transit | Egress | 1 | 19 | 55 | |
| I. | Shadow | Egress | 1 | 20 | 57 | |
| II. | Transit | Ingress | 2 | 4 | 29 | |
| II. | Shadow | Ingress W. | 2 | 6 | 33 | |
| II. | Transit | Egress W. | 2 | 7 | 25 | |
| II. | Shadow | Egress | 2 | 9 | 28 | |
| I. | Occult. | Disapp. | 2 | 14 | 57 | |
| I. | Eclipse | Reapp. | 2 | 18 | 14 | 23.0 |
| I. | Transit | Ingress | 3 | 12 | 6 | |
| I. | Shadow | Ingress | 3 | 13 | 6 | |
| I. | Transit | Egress | 3 | 14 | 25 | |
| I. | Shadow | Egress | 3 | 15 | 25 | |
| IV. | Occult. | Disapp. | 3 | 16 | 38 | |
| IV. | Occult. | Reapp. | 3 | 21 | 13 | |
| II. | Occult. | Disapp. | 3 | 22 | 42 | |
| IV. | Eclipse | Disapp. | 4 | 2 | 10 | 25.7 |
| II. | Eclipse | Reapp. | 4 | 3 | 34 | 26.7 |
| IV. | Eclipse | Reapp. W. | 4 | 6 | 17 | 52.9 |
| I. | Occult. | Disapp. | 4 | 9 | 27 | |
| I. | Eclipse | Reapp. | 4 | 12 | 43 | 10.1 |
| III. | Occult. | Disapp. | 4 | 21 | 4 | |
| III. | Occult. | Reapp. | 5 | 0 | 43 | |
| III. | Eclipse | Disapp. | 5 | 1 | 10 | 17.1 |
| III. | Eclipse | Reapp. | 5 | 4 | 32 | 58.3 |
| I. | Transit | Ingress W. | 5 | 6 | 36 | |
| I. | Shadow | Ingress W. | 5 | 7 | 34 | |
| I. | Transit | Egress | 5 | 8 | 55 | |
| I. | Shadow | Egress | 5 | 9 | 53 | |
| II. | Transit | Ingress | 5 | 17 | 54 | |
| II. | Shadow | Ingress | 5 | 19 | 52 | |
| II. | Transit | Egress | 5 | 20 | 50 | |
| II. | Shadow | Egress | 5 | 22 | 47 | |
| I. | Occult. | Disapp. | 6 | 3 | 57 | |
| I. | Eclipse | Reapp. W. | 6 | 7 | 12 | 0.1 |
| I. | Transit | Ingress | 7 | 1 | 6 | |
| I. | Shadow | Ingress | 7 | 2 | 3 | |
| I. | Transit | Egress | 7 | 3 | 25 | |
| I. | Shadow | Egress | 7 | 4 | 22 | |
| II. | Occult. | Disapp. | 7 | 12 | 6 | |
| II. | Eclipse | Reapp. | 7 | 16 | 2 | 59.7 |
| I. | Occult. | Disapp. | 7 | 22 | 27 | |
| I. | Eclipse | Reapp. | 8 | 1 | 40 | 47.1 |
| III. | Transit | Ingress | 8 | 11 | 23 | |
| III. | Transit | Egress | 8 | 15 | 2 | |
| III. | Shadow | Ingress | 8 | 15 | 13 | |
| III. | Shadow | Egress | 8 | 18 | 44 | |
| I. | Transit | Ingress | 8 | 19 | 37 | |
| I. | Shadow | Ingress | 8 | 20 | 32 | |
| I. | Transit | Egress | 8 | 21 | 56 | |
| I. | Shadow | Egress | 8 | 22 | 51 | |
| II. | Transit | Ingress W. | 9 | 7 | 18 | |
| II. | Shadow | Ingress | 9 | 9 | 11 | |
| II. | Transit | Egress | 9 | 10 | 14 | |
| II. | Shadow | Egress | 9 | 12 | 5 | |
| I. | Occult. | Disapp. | 9 | 16 | 57 | |
| I. | Eclipse | Reapp. | 9 | 20 | 9 | 38.3 |
| I. | Transit | Ingress | 10 | 14 | 7 | |
| I. | Shadow | Ingress | 10 | 15 | 1 | |
| I. | Transit | Egress | 10 | 16 | 26 | |
| I. | Shadow | Egress | 10 | 17 | 20 | |
| II. | Occult. | Disapp. | 11 | 1 | 31 | |
| II. | Eclipse | Reapp. W. | 11 | 6 | 12 | 8.4 |
| I. | Occult. | Disapp. | 11 | 11 | 27 | |
| I. | Eclipse | Reapp. | 11 | 14 | 38 | 24.4 |
| III. | Occult. | Disapp. | 12 | 1 | 39 | |
| IV. | Transit | Ingress | 12 | 4 | 32 | |
| III. | Occult. | Reapp. | 12 | 5 | 8 | |
| III. | Eclipse | Disapp. | 12 | 5 | 11 | 53.2 |
| III. | Eclipse | Reapp. | 12 | 8 | 33 | 56.2 |
| I. | Transit | Ingress | 12 | 8 | 38 | |
| IV. | Transit | Egress | 12 | 9 | 14 | |
| I. | Shadow | Ingress | 12 | 9 | 30 | |
| I. | Transit | Egress | 12 | 10 | 57 | |
| I. | Shadow | Egress | 12 | 11 | 49 | |
| IV. | Shadow | Ingress | 12 | 13 | 1 | |
| IV. | Shadow | Egress | 12 | 17 | 19 | |
| II. | Transit | Ingress | 12 | 20 | 43 | |
| II. | Shadow | Ingress | 12 | 22 | 30 | |
| II. | Transit | Egress | 12 | 22 | 39 | |
| II. | Shadow | Egress | 13 | 1 | 25 | |
| I. | Occult. | Disapp. W. | 13 | 5 | 58 | |
| I. | Eclipse | Reapp. | 13 | 9 | 7 | 12.7 |
| I. | Transit | Ingress | 14 | 3 | 8 | |
| I. | Shadow | Ingress | 14 | 3 | 59 | |
| I. | Transit | Egress | 14 | 5 | 27 | |
| I. | Shadow | Egress W. | 14 | 6 | 18 | |
| II. | Occult. | Disapp. | 14 | 14 | 55 | |
| II. | Eclipse | Reapp. | 14 | 19 | 30 | 41.5 |
| I. | Occult. | Disapp. | 15 | 0 | 28 | |
| I. | Eclipse | Reapp. | 15 | 3 | 35 | 58.3 |
| III. | Transit | Ingress | 15 | 15 | 49 | |
| III. | Shadow | Ingress | 15 | 19 | 14 | |

## WASHINGTON MEAN TIME.

### JANUARY.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III. | Transit | Egress | 15 | 19 | 28 | | I. | Transit | Egress | 23 | 1 | 59 | |
| I. | Transit | Ingress | 15 | 21 | 38 | | I. | Shadow | Egress | 23 | 2 | 42 | |
| I. | Shadow | Ingress | 15 | 22 | 27 | | III. | Shadow | Egress | 23 | 2 | 48 | |
| III. | Shadow | Egress | 15 | 22 | 46 | | II. | Transit | Ingress | 23 | 12 | 57 | |
| I. | Transit | Egress | 15 | 23 | 57 | | II. | Shadow | Ingress | 23 | 14 | 24 | |
| I. | Shadow | Egress | 16 | 0 | 46 | | II. | Transit | Egress | 23 | 15 | 53 | |
| II. | Transit | Ingress | 16 | 10 | 7 | | II. | Shadow | Egress | 23 | 17 | 18 | |
| II. | Shadow | Ingress | 16 | 11 | 48 | | I. | Occult. | Disapp. | 23 | 21 | 1 | |
| II. | Transit | Egress | 16 | 13 | 3 | | I. | Eclipse | Reapp. | 23 | 23 | 59 | 51.5 |
| II. | Shadow | Egress | 16 | 14 | 42 | | I. | Transit | Ingress | 24 | 18 | 11 | |
| I. | Occult. | Disapp. | 16 | 18 | 59 | | I. | Shadow | Ingress | 24 | 18 | 52 | |
| I. | Eclipse | Reapp. | 16 | 22 | 3 | 48.0 | I. | Transit | Egress | 24 | 20 | 30 | |
| I. | Transit | Ingress | 17 | 16 | 9 | | I. | Shadow | Egress | 24 | 21 | 11 | |
| I. | Shadow | Ingress | 17 | 16 | 56 | | II. | Occult. | Disapp. | 25 | 7 | 12 | |
| I. | Transit | Egress | 17 | 18 | 28 | | II. | Eclipse | Reapp. | 25 | 11 | 27 | 44.4 |
| I. | Shadow | Egress | 17 | 19 | 15 | | I. | Occult. | Disapp. | 25 | 15 | 31 | |
| II. | Occult. | Disapp. | 18 | 4 | 21 | | I. | Eclipse | Reapp. | 25 | 18 | 28 | 34.8 |
| II. | Eclipse | Reapp. | 18 | 8 | 49 | 54.4 | III. | Occult. | Disapp. | 26 | 10 | 25 | |
| I. | Occult. | Disapp. | 18 | 13 | 29 | | I. | Transit | Ingress | 26 | 12 | 41 | |
| I. | Eclipse | Reapp. | 18 | 16 | 33 | 32.6 | I. | Shadow | Ingress | 26 | 13 | 20 | |
| III. | Occult. | Disapp. W. | 19 | 5 | 56 | | I. | Transit | Egress | 26 | 15 | 0 | |
| I. | Transit | Ingress | 19 | 10 | 39 | | I. | Shadow | Egress | 26 | 15 | 39 | |
| I. | Shadow | Ingress | 19 | 11 | 25 | | III. | Eclipse | Reapp. | 26 | 16 | 35 | 56.2 |
| III. | Eclipse | Reapp. | 19 | 12 | 34 | 55.2 | II. | Transit | Ingress | 27 | 2 | 22 | |
| I. | Transit | Egress | 19 | 12 | 58 | | II. | Shadow | Ingress | 27 | 3 | 42 | |
| I. | Shadow | Egress | 19 | 13 | 44 | | II. | Transit | Egress | 27 | 5 | 18 | |
| II. | Transit | Ingress | 19 | 23 | 32 | | II. | Shadow | Egress W. | 27 | 6 | 36 | |
| II. | Shadow | Ingress | 20 | 1 | 6 | | I. | Occult. | Disapp. | 27 | 10 | 2 | |
| II. | Transit | Egress | 20 | 2 | 28 | | I. | Eclipse | Reapp. | 27 | 12 | 57 | 19.9 |
| II. | Shadow | Egress | 20 | 4 | 0 | | I. | Transit | Ingress | 28 | 7 | 12 | |
| I. | Occult. | Disapp. | 20 | 8 | 0 | | I. | Shadow | Ingress | 28 | 7 | 49 | |
| I. | Eclipse | Reapp. | 20 | 11 | 2 | 19.3 | I. | Transit | Egress | 28 | 9 | 31 | |
| IV. | Occult. | Disapp. | 20 | 12 | 59 | | I. | Shadow | Egress | 28 | 10 | 8 | |
| IV. | Occult. | Reapp. | 20 | 17 | 40 | | II. | Occult. | Disapp. | 28 | 20 | 38 | |
| IV. | Eclipse | Disapp. | 20 | 20 | 28 | 22.4 | II. | Eclipse | Reapp. | 29 | 0 | 46 | 17.6 |
| IV. | Eclipse | Reapp. | 21 | 0 | 29 | 53.8 | IV. | Transit | Ingress | 29 | 1 | 13 | |
| I. | Transit | Ingress | 21 | 5 | 10 | | I. | Occult. | Disapp. | 29 | 4 | 32 | |
| I. | Shadow | Ingress W. | 21 | 5 | 54 | | IV. | Transit | Egress | 29 | 5 | 50 | |
| I. | Transit | Egress | 21 | 7 | 29 | | IV. | Shadow | Ingress | 29 | 7 | 18 | |
| I. | Shadow | Egress | 21 | 8 | 13 | | I. | Eclipse | Reapp. | 29 | 7 | 26 | 2.4 |
| II. | Occult. | Disapp. | 21 | 17 | 46 | | IV. | Shadow | Egress | 29 | 11 | 31 | |
| II. | Eclipse | Reapp. | 21 | 22 | 8 | 27.6 | III. | Transit | Ingress | 30 | 0 | 48 | |
| I. | Occult. | Disapp. | 22 | 2 | 30 | | I. | Transit | Ingress | 30 | 1 | 42 | |
| I. | Eclipse | Reapp. | 22 | 5 | 31 | 3.4 | I. | Shadow | Ingress | 30 | 2 | 18 | |
| III. | Transit | Ingress | 22 | 20 | 18 | | III. | Shadow | Ingress | 30 | 3 | 18 | |
| III. | Shadow | Ingress | 22 | 23 | 16 | | I. | Transit | Egress | 30 | 4 | 1 | |
| I. | Transit | Ingress | 22 | 23 | 40 | | III. | Transit | Egress | 30 | 4 | 25 | |
| III. | Transit | Egress | 22 | 23 | 56 | | I. | Shadow | Egress | 30 | 4 | 37 | |
| I. | Shadow | Ingress | 23 | 0 | 23 | | III. | Shadow | Egress | 30 | 6 | 49 | |

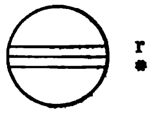
## WASHINGTON MEAN TIME.

### JANUARY.

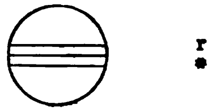
| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II. | Transit | Ingress | 30 | 15 | 47 | | I. | Eclipse | Reapp. | 31 | 1 | 54 | 48.9 |
| II. | Shadow | Ingress | 30 | 17 | 0 | | I. | Transit | Ingress | 31 | 20 | 13 | |
| II. | Transit | Egress | 30 | 18 | 42 | | I. | Shadow | Ingress | 31 | 20 | 47 | |
| II. | Shadow | Egress | 30 | 19 | 55 | | I. | Transit | Egress | 31 | 22 | 32 | |
| I. | Occult. | Disapp. | 30 | 23 | 3 | | I. | Shadow | Egress | 31 | 23 | 6 | |

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

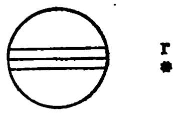
I.



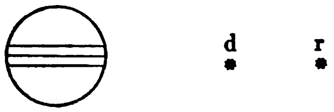
III.



II.



IV.



### FEBRUARY.

The Satellites are not visible this month, Jupiter being too near the Sun.

### MARCH.

The Satellites are not visible this month, Jupiter being too near the Sun.

### APRIL.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Shadow | Ingress | 1 | 1 | 5 | | III. | Shadow | Ingress | 3 | 15 | 33 | |
| I. | Transit | Ingress | 1 | 1 | 37 | | II. | Shadow | Ingress | 3 | 16 | 19 | |
| I. | Shadow | Egress | 1 | 3 | 23 | | I. | Eclipse | Disapp. | 3 | 16 | 52 | 11.7 |
| I. | Transit | Egress | 1 | 3 | 55 | | II. | Transit | Ingress | 3 | 17 | 23 | |
| II. | Eclipse | Disapp. | 1 | 21 | 38 | 13.8 | III. | Transit | Ingress | 3 | 17 | 37 | |
| I. | Eclipse | Disapp. | 1 | 22 | 23 | 40.2 | III. | Shadow | Egress | 3 | 18 | 58 | |
| I. | Occult. | Reapp. | 2 | 1 | 6 | | II. | Shadow | Egress | 3 | 19 | 12 | |
| II. | Occult. | Reapp. | 2 | 1 | 30 | | I. | Occult. | Reapp. | 3 | 19 | 37 | |
| I. | Shadow | Ingress | 2 | 19 | 34 | | II. | Transit | Egress | 3 | 20 | 15 | |
| I. | Transit | Ingress | 2 | 20 | 6 | | III. | Transit | Egress | 3 | 21 | 2 | |
| I. | Shadow | Egress | 2 | 21 | 52 | | I. | Shadow | Ingress | 4 | 14 | 3 | |
| I. | Transit | Egress | 2 | 22 | 24 | | I. | Transit | Ingress | 4 | 14 | 35 | |

## WASHINGTON MEAN TIME.

### APRIL.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Egress | 4 | 16 | 21 | |
| I. | Transit | Egress | 4 | 16 | 53 | |
| IV. | Shadow | Ingress | 5 | 8 | 27 | |
| II. | Eclipse | Disapp. | 5 | 10 | 57 | 45.4 |
| I. | Eclipse | Disapp. | 5 | 11 | 20 | 49.2 |
| IV. | Shadow | Egress | 5 | 12 | 12 | |
| IV. | Transit | Ingress | 5 | 13 | 35 | |
| I. | Occult. | Reapp. | 5 | 14 | 8 | |
| II. | Occult. | Reapp. | 5 | 14 | 56 | |
| IV. | Transit | Egress | 5 | 17 | 22 | |
| I. | Shadow | Ingress | 6 | 8 | 32 | |
| I. | Transit | Ingress | 6 | 9 | 6 | |
| I. | Shadow | Egress | 6 | 10 | 50 | |
| I. | Transit | Egress | 6 | 11 | 24 | |
| III. | Eclipse | Disapp. | 7 | 5 | 29 | 51.7 |
| II. | Shadow | Ingress | 7 | 5 | 36 | |
| I. | Eclipse | Disapp. | 7 | 5 | 49 | 16.3 |
| II. | Transit | Ingress | 7 | 6 | 47 | |
| II. | Shadow | Egress | 7 | 8 | 29 | |
| I. | Occult. | Reapp. | 7 | 8 | 39 | |
| II. | Transit | Egress | 7 | 9 | 40 | |
| III. | Occult. | Reapp. | 7 | 11 | 9 | |
| I. | Shadow | Ingress | 8 | 3 | 1 | |
| I. | Transit | Ingress | 8 | 3 | 36 | |
| I. | Shadow | Egress | 8 | 5 | 19 | |
| I. | Transit | Egress | 8 | 5 | 54 | |
| II. | Eclipse | Disapp. | 9 | 0 | 16 | 8.2 |
| I. | Eclipse | Disapp. | 9 | 0 | 17 | 47.2 |
| I. | Occult. | Reapp. | 9 | 3 | 10 | |
| II. | Occult. | Reapp. | 9 | 4 | 23 | |
| I. | Shadow | Ingress | 9 | 21 | 30 | |
| I. | Transit | Ingress | 9 | 22 | 7 | |
| I. | Shadow | Egress | 9 | 23 | 48 | |
| I. | Transit | Egress | 10 | 0 | 25 | |
| I. | Eclipse | Disapp. | 10 | 18 | 46 | 19.2 |
| II. | Shadow | Ingress | 10 | 18 | 54 | |
| III. | Shadow | Ingress | 10 | 19 | 34 | |
| II. | Transit | Ingress | 10 | 20 | 12 | |
| I. | Occult. | Reapp. | 10 | 21 | 40 | |
| II. | Shadow | Egress | 10 | 21 | 46 | |
| III. | Transit | Ingress | 10 | 22 | 9 | |
| III. | Shadow | Egress | 10 | 22 | 58 | |
| II. | Transit | Egress | 10 | 23 | 4 | |
| III. | Transit | Egress | 11 | 1 | 32 | |
| I. | Shadow | Ingress | 11 | 15 | 58 | |
| I. | Transit | Ingress | 11 | 16 | 38 | |
| I. | Shadow | Egress | 11 | 18 | 16 | |
| I. | Transit | Egress | 11 | 18 | 56 | |
| I. | Eclipse | Disapp. | 12 | 13 | 14 | 51.0 |
| II. | Eclipse | Disapp. | 12 | 13 | 35 | 37.5 |
| I. | Occult. | Reapp. | 12 | 16 | 10 | |
| II. | Occult. | Reapp. | 12 | 17 | 48 | |
| I. | Shadow | Ingress | 13 | 10 | 27 | |
| I. | Transit | Ingress | 13 | 11 | 9 | |
| I. | Shadow | Egress | 13 | 12 | 45 | |
| I. | Transit | Egress | 13 | 13 | 27 | |
| IV. | Eclipse | Disapp. | 13 | 15 | 54 | 15.5 |
| IV. | Eclipse | Reapp. | 13 | 19 | 19 | 16.5 |
| IV. | Occult. | Disapp. | 13 | 22 | 17 | |
| IV. | Occult. | Reapp. | 14 | 1 | 54 | |
| I. | Eclipse | Disapp. | 14 | 7 | 43 | 20.9 |
| II. | Shadow | Ingress | 14 | 8 | 11 | |
| III. | Eclipse | Disapp. | 14 | 9 | 30 | 35.4 |
| II. | Transit | Ingress | 14 | 9 | 36 | |
| I. | Occult. | Reapp. | 14 | 10 | 40 | |
| II. | Shadow | Egress | 14 | 11 | 4 | |
| II. | Transit | Egress | 14 | 12 | 28 | |
| III. | Occult. | Reapp. | 14 | 15 | 37 | |
| I. | Shadow | Ingress | 15 | 4 | 56 | |
| I. | Transit | Ingress | 15 | 5 | 39 | |
| I. | Shadow | Egress | 15 | 7 | 14 | |
| I. | Transit | Egress | 15 | 7 | 57 | |
| I. | Eclipse | Disapp. | 16 | 2 | 11 | 50.9 |
| II. | Eclipse | Disapp. | 16 | 2 | 53 | 58.2 |
| I. | Occult. | Reapp. | 16 | 5 | 10 | |
| II. | Occult. | Reapp. | 16 | 7 | 13 | |
| I. | Shadow | Ingress | 16 | 23 | 24 | |
| I. | Transit | Ingress | 17 | 0 | 9 | |
| I. | Shadow | Egress | 17 | 1 | 42 | |
| I. | Transit | Egress | 17 | 2 | 27 | |
| I. | Eclipse | Disapp. | 17 | 20 | 40 | 20.7 |
| II. | Shadow | Ingress | 17 | 21 | 29 | |
| II. | Transit | Ingress | 17 | 23 | 0 | |
| III. | Shadow | Ingress | 17 | 23 | 36 | |
| I. | Occult. | Reapp. | 17 | 23 | 40 | |
| II. | Shadow | Egress | 18 | 0 | 21 | |
| II. | Transit | Egress | 18 | 1 | 52 | |
| III. | Transit | Ingress | 18 | 2 | 39 | |
| III. | Shadow | Egress | 18 | 2 | 59 | |
| III. | Transit | Egress | 18 | 6 | 0 | |
| I. | Shadow | Ingress | 18 | 17 | 53 | |
| I. | Transit | Ingress | 18 | 18 | 39 | |
| I. | Shadow | Egress | 18 | 20 | 11 | |
| I. | Transit | Egress | 18 | 20 | 57 | |
| I. | Eclipse | Disapp. | 19 | 15 | 8 | 52.8 |
| II. | Eclipse | Disapp. | 19 | 16 | 13 | 24.7 |
| I. | Occult. | Reapp. | 19 | 18 | 10 | |
| II. | Occult. | Reapp. | 19 | 20 | 39 | |

## WASHINGTON MEAN TIME.

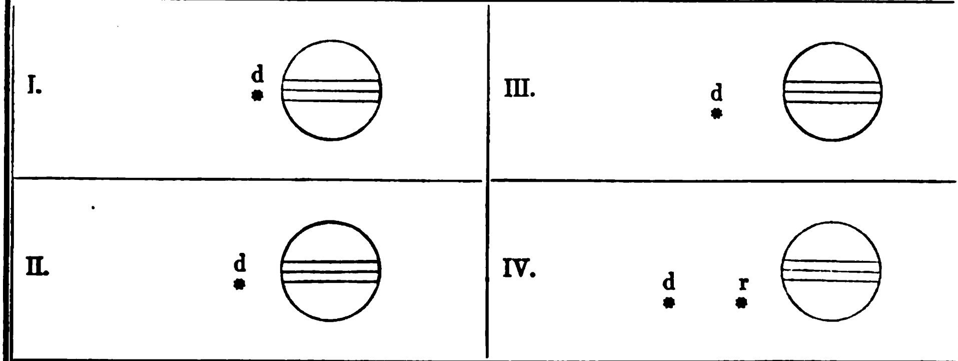
### APRIL.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Shadow | Ingress | 20 | 12 | 22 | | III. | Transit | Ingress | 25 | 7 | 7 | |
| I. | Transit | Ingress | 20 | 13 | 10 | | III. | Transit | Egress | 25 | 10 | 26 | |
| I. | Shadow | Egress | 20 | 14 | 40 | | I. | Shadow | Ingress | 25 | 19 | 48 | |
| I. | Transit | Egress | 20 | 15 | 28 | | I. | Transit | Ingress | 25 | 20 | 40 | |
| I. | Eclipse | Disapp. | 21 | 9 | 37 | 21.7 | I. | Shadow | Egress | 25 | 22 | 6 | |
| II. | Shadow | Ingress | 21 | 10 | 46 | | I. | Transit | Egress | 25 | 22 | 58 | |
| II. | Transit | Ingress | 21 | 12 | 24 | | I. | Eclipse | Disapp. | 26 | 17 | 2 | 50.7 |
| I. | Occult. | Reapp. | 21 | 12 | 40 | | II. | Eclipse | Disapp. | 26 | 18 | 51 | 5.8 |
| III. | Eclipse | Disapp. | 21 | 13 | 31 | 9.8 | I. | Occult. | Reapp. | 26 | 20 | 10 | |
| II. | Shadow | Egress | 21 | 13 | 38 | | II. | Occult. | Reapp. | 26 | 23 | 30 | |
| II. | Transit | Egress | 21 | 15 | 16 | | I. | Shadow | Ingress | 27 | 14 | 16 | |
| III. | Occult. | Reapp. | 21 | 20 | 3 | | I. | Transit | Ingress | 27 | 15 | 10 | |
| IV. | Shadow | Ingress | 22 | 2 | 43 | | I. | Shadow | Egress | 27 | 16 | 34 | |
| IV. | Shadow | Egress | 22 | 6 | 20 | | I. | Transit | Egress | 27 | 17 | 28 | |
| I. | Shadow | Ingress | 22 | 6 | 50 | | I. | Eclipse | Disapp. | 28 | 11 | 31 | 18.6 |
| I. | Transit | Ingress | 22 | 7 | 40 | | II. | Shadow | Ingress | 28• | 13 | 20 | |
| I. | Shadow | Egress | 22 | 9 | 8 | | I. | Occult. | Reapp. | 28 | 14 | 40 | |
| I. | Transit | Egress | 22 | 9 | 58 | | II. | Transit | Ingress | 28 | 15 | 12 | |
| IV. | Transit | Ingress | 22 | 10 | 29 | | II. | Shadow | Egress W. | 28 | 16 | 13 | |
| IV. | Transit | Egress | 22 | 13 | 56 | | III. | Eclipse | Disapp. | 28 | 17 | 31 | 52.0 |
| I. | Eclipse | Disapp. | 23 | 4 | 5 | 50.8 | II. | Transit | Egress | 28 | 18 | 3 | |
| II. | Eclipse | Disapp. | 23 | 5 | 31 | 43.0 | III. | Eclipse | Reapp. | 28 | 20 | 42 | 33.4 |
| I. | Occult. | Reapp. | 23 | 7 | 10 | | III. | Occult. | Disapp. | 28 | 21 | 9 | |
| II. | Occult. | Reapp. | 23 | 10 | 4 | | III. | Occult. | Reapp. | 29 | 0 | 27 | |
| I. | Shadow | Ingress | 24 | 1 | 19 | | I. | Shadow | Ingress | 29 | 8 | 45 | |
| I. | Transit | Ingress | 24 | 2 | 10 | | I. | Transit | Ingress | 29 | 9 | 40 | |
| I. | Shadow | Egress | 24 | 3 | 37 | | I. | Shadow | Egress | 29 | 11 | 2 | |
| I. | Transit | Egress | 24 | 4 | 28 | | I. | Transit | Egress | 29 | 11 | 57 | |
| I. | Eclipse | Disapp. | 24 | 22 | 34 | 20.3 | I. | Eclipse | Disapp. | 30 | 5 | 59 | 47.0 |
| II. | Shadow | Ingress | 25 | 0 | 3 | | II. | Eclipse | Disapp. | 30 | 8 | 9 | 21.8 |
| I. | Occult. | Reapp. | 25 | 1 | 40 | | I. | Occult. | Reapp. | 30 | 9 | 10 | |
| II. | Transit | Ingress | 25 | 1 | 48 | | IV. | Eclipse | Disapp. | 30 | 10 | 11 | 58.0 |
| II. | Shadow | Egress | 25 | 2 | 56 | | II. | Occult. | Reapp. | 30 | 12 | 54 | |
| III. | Shadow | Ingress | 25 | 3 | 37 | | IV. | Eclipse | Reapp. | 30 | 13 | 27 | 49.8 |
| II. | Transit | Egress | 25 | 4 | 40 | | IV. | Occult. | Disapp. | 30 | 19 | 5 | |
| III. | Shadow | Egress | 25 | 7 | 0 | | IV. | Occult. | Reapp. | 30 | 22 | 19 | |

## WASHINGTON MEAN TIME.

## APRIL.

### Phases of the Eclipses of the Satellites for an Inverting Telescope.



## MAY.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Ingress | 1 | 3 | 14 | |
| I. | Transit | Ingress | 1 | 4 | 10 | |
| I. | Shadow | Egress | 1 | 5 | 31 | |
| I. | Transit | Egress | 1 | 6 | 27 | |
| I. | Eclipse | Disapp. | 2 | 0 | 28 | 15.6 |
| II. | Shadow | Ingress | 2 | 2 | 37 | |
| I. | Occult. | Reapp. | 2 | 3 | 40 | |
| II. | Transit | Ingress | 2 | 4 | 35 | |
| II. | Shadow | Egress | 2 | 5 | 30 | |
| II. | Transit | Egress | 2 | 7 | 26 | |
| III. | Shadow | Ingress | 2 | 7 | 39 | |
| III. | Shadow | Egress | 2 | 11 | 0 | |
| III. | Transit | Ingress | 2 | 11 | 34 | |
| III. | Transit | Egress | 2 | 14 | 51 | |
| I. | Shadow | Ingress | 2 | 21 | 42 | |
| I. | Transit | Ingress | 2 | 22 | 40 | |
| I. | Shadow | Egress | 2 | 23 | 59 | |
| I. | Transit | Egress | 3 | 0 | 57 | |
| I. | Eclipse | Disapp. | 3 | 18 | 56 | 45.4 |
| II. | Eclipse | Disapp. | 3 | 21 | 28 | 40.3 |
| I. | Occult. | Reapp. | 3 | 22 | 10 | |
| II. | Occult. | Reapp. | 4 | 2 | 19 | |
| I. | Shadow | Ingress W. | 4 | 16 | 11 | |
| I. | Transit | Ingress | 4 | 17 | 10 | |
| I. | Shadow | Egress | 4 | 18 | 28 | |
| I. | Transit | Egress | 4 | 19 | 27 | |
| I. | Eclipse | Disapp. | 5 | 13 | 25 | 12.6 |
| II. | Shadow | Ingress W. | 5 | 15 | 55 | |
| I. | Occult. | Reapp. | 5 | 16 | 40 | |
| II. | Transit | Ingress | 5 | 18 | 9 | |
| II. | Shadow | Egress | 5 | 18 | 47 | |
| II. | Transit | Egress | 5 | 20 | 49 | |
| III. | Eclipse | Disapp. | 5 | 21 | 32 | 37.6 |
| III. | Eclipse | Reapp. | 6 | 0 | 42 | 27.0 |
| III. | Occult. | Disapp. | 6 | 1 | 34 | |
| III. | Occult. | Reapp. | 6 | 4 | 50 | |
| I. | Shadow | Ingress | 6 | 10 | 40 | |
| I. | Transit | Ingress | 6 | 11 | 40 | |
| I. | Shadow | Egress | 6 | 12 | 57 | |
| I. | Transit | Egress | 6 | 13 | 57 | |
| I. | Eclipse | Disapp. | 7 | 7 | 53 | 40.4 |
| II. | Eclipse | Disapp. | 7 | 10 | 46 | 53.8 |
| I. | Occult. | Reapp. | 7 | 11 | 10 | |
| II. | Occult. | Reapp. W. | 7 | 15 | 42 | |
| I. | Shadow | Ingress | 8 | 5 | 8 | |
| I. | Transit | Ingress | 8 | 6 | 10 | |
| I. | Shadow | Egress | 8 | 7 | 25 | |
| I. | Transit | Egress | 8 | 8 | 27 | |
| IV. | Shadow | Ingress | 8 | 21 | 0 | |
| IV. | Shadow | Egress | 9 | 0 | 28 | |
| I. | Eclipse | Disapp. | 9 | 2 | 22 | 8.0 |
| II. | Shadow | Ingress | 9 | 5 | 13 | |
| I. | Occult. | Reapp. | 9 | 5 | 39 | |
| IV. | Transit | Ingress | 9 | 7 | 6 | |
| II. | Transit | Ingress | 9 | 7 | 21 | |
| II. | Shadow | Egress | 9 | 8 | 4 | |
| IV. | Transit | Egress | 9 | 10 | 6 | |
| II. | Transit | Egress | 9 | 10 | 12 | |
| III. | Shadow | Ingress | 9 | 11 | 40 | |
| III. | Shadow | Egress | 9 | 15 | 1 | |

## WASHINGTON MEAN TIME.

## MAY.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| III. | Transit | Ingress W. | 9 | 15 | 58 | |
| III. | Transit | Egress | 9 | 19 | 13 | |
| I. | Shadow | Ingress | 9 | 23 | 37 | |
| I. | Transit | Ingress | 10 | 0 | 40 | |
| I. | Shadow | Egress | 10 | 1 | 54 | |
| I. | Transit | Egress | 10 | 2 | 57 | |
| I. | Eclipse | Disapp. | 10 | 20 | 50 | 37.6 |
| II. | Eclipse | Disapp. | 11 | 0 | 6 | 7.7 |
| I. | Occult. | Reapp. | 11 | 0 | 9 | |
| II. | Occult. | Reapp. | 11 | 5 | 7 | |
| I. | Shadow | Ingress | 11 | 18 | 5 | |
| I. | Transit | Ingress | 11 | 19 | 10 | |
| I. | Shadow | Egress | 11 | 20 | 22 | |
| I. | Transit | Egress | 11 | 21 | 27 | |
| I. | Eclipse | Disapp. | 12 | 15 | 19 | 4.1 |
| II. | Shadow | Ingress | 12 | 18 | 30 | |
| I. | Occult. | Reapp. | 12 | 18 | 39 | |
| II. | Transit | Ingress | 12 | 20 | 44 | |
| II. | Shadow | Egress | 12 | 21 | 21 | |
| II. | Transit | Egress | 12 | 23 | 34 | |
| III. | Eclipse | Disapp. | 13 | 1 | 33 | 59.5 |
| III. | Eclipse | Reapp. | 13 | 4 | 42 | 56.1 |
| III. | Occult. | Disapp. | 13 | 5 | 58 | |
| III. | Occult. | Reapp. | 13 | 9 | 11 | |
| I. | Shadow | Ingress | 13 | 12 | 34 | |
| I. | Transit | Ingress | 13 | 13 | 40 | |
| I. | Shadow | Egress | 13 | 14 | 51 | |
| I. | Transit | Egress W. | 13 | 15 | 57 | |
| I. | Eclipse | Disapp. | 14 | 9 | 47 | 31.6 |
| I. | Occult. | Reapp. | 14 | 13 | 8 | |
| II. | Eclipse | Disapp. | 14 | 13 | 24 | 18.3 |
| II. | Occult. | Reapp. | 14 | 18 | 30 | |
| I. | Shadow | Ingress | 15 | 7 | 2 | |
| I. | Transit | Ingress | 15 | 8 | 10 | |
| I. | Shadow | Egress | 15 | 9 | 19 | |
| I. | Transit | Egress | 15 | 10 | 27 | |
| I. | Eclipse | Disapp. | 16 | 4 | 15 | 58.2 |
| I. | Occult. | Reapp. | 16 | 7 | 38 | |
| II. | Shadow | Ingress | 16 | 7 | 47 | |
| II. | Transit | Ingress | 16 | 10 | 6 | |
| II. | Shadow | Egress | 16 | 10 | 38 | |
| II. | Transit | Egress | 16 | 12 | 56 | |
| III. | Shadow | Ingress W. | 16 | 15 | 40 | |
| III. | Shadow | Egress | 16 | 19 | 1 | |
| III. | Transit | Ingress | 16 | 20 | 20 | |
| III. | Transit | Egress | 16 | 23 | 32 | |
| I. | Shadow | Ingress | 17 | 1 | 31 | |
| I. | Transit | Ingress | 17 | 2 | 40 | |
| I. | Shadow | Egress | 17 | 3 | 48 | |
| IV. | Eclipse | Disapp. | 17 | 4 | 29 | 18.0 |
| I. | Transit | Egress | 17 | 4 | 57 | |
| IV. | Eclipse | Reapp. | 17 | 7 | 35 | 16.4 |
| IV. | Occult. | Disapp. W. | 17 | 15 | 32 | |
| IV. | Occult. | Reapp. | 17 | 18 | 15 | |
| I. | Eclipse | Disapp. | 17 | 22 | 44 | 27.5 |
| I. | Occult. | Reapp. | 18 | 2 | 8 | |
| II. | Eclipse | Disapp. | 18 | 2 | 43 | 27.0 |
| II. | Occult. | Reapp. | 18 | 7 | 54 | |
| I. | Shadow | Ingress | 18 | 19 | 59 | |
| I. | Transit | Ingress | 18 | 21 | 10 | |
| I. | Shadow | Egress | 18 | 22 | 16 | |
| I. | Transit | Egress | 18 | 23 | 27 | |
| I. | Eclipse | Disapp. | 19 | 17 | 12 | 53.1 |
| I. | Occult. | Reapp. | 19 | 20 | 37 | |
| II. | Shadow | Ingress | 19 | 21 | 4 | |
| II. | Transit | Ingress | 19 | 23 | 28 | |
| II. | Shadow | Egress | 19 | 23 | 56 | |
| II. | Transit | Egress | 20 | 2 | 18 | |
| III. | Eclipse | Disapp. | 20 | 5 | 34 | 50.0 |
| III. | Eclipse | Reapp. | 20 | 8 | 42 | 52 8 |
| III. | Occult. | Disapp. | 20 | 10 | 19 | |
| III. | Occult. | Reapp. | 20 | 13 | 30 | |
| I. | Shadow | Ingress | 20 | 14 | 28 | |
| I. | Transit | Ingress W. | 20 | 15 | 39 | |
| I. | Shadow | Egress | 20 | 16 | 46 | |
| I. | Transit | Egress | 20 | 17 | 56 | |
| I. | Eclipse | Disapp. | 21 | 11 | 41 | 20.3 |
| I. | Occult. | Reapp. | 21 | 15 | 7 | |
| II. | Eclipse | Disapp. W. | 21 | 16 | 1 | 34.6 |
| II. | Occult. | Reapp. | 21 | 21 | 17 | |
| I. | Shadow | Ingress | 22 | 8 | 57 | |
| I. | Transit | Ingress | 22 | 10 | 9 | |
| I. | Shadow | Egress | 22 | 11 | 14 | |
| I. | Transit | Egress | 22 | 12 | 26 | |
| I. | Eclipse | Disapp. | 23 | 6 | 9 | 46.5 |
| I. | Occult. | Reapp. | 23 | 9 | 36 | |
| II. | Shadow | Ingress | 23 | 10 | 22 | |
| II. | Transit | Ingress | 23 | 12 | 50 | |
| II. | Shadow | Egress | 23 | 13 | 13 | |
| II. | Transit | Egress W. | 23 | 15 | 39 | |
| III. | Shadow | Ingress | 23 | 19 | 41 | |
| III. | Shadow | Egress | 23 | 23 | 0 | |
| III. | Transit | Ingress | 24 | 0 | 40 | |
| I. | Shadow | Ingress | 24 | 3 | 25 | |
| III. | Transit | Egress | 24 | 3 | 50 | |
| I. | Transit | Ingress | 24 | 4 | 39 | |
| I. | Shadow | Egress | 24 | 5 | 42 | |
| I. | Transit | Egress | 24 | 6 | 56 | |

WASHINGTON MEAN TIME.

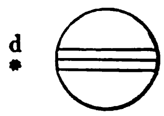
## MAY.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 25 | 0 | 38 | 15.4 |
| I. | Occult. | Reapp. | 25 | 4 | 6 | |
| II. | Eclipse | Disapp. | 25 | 5 | 20 | 38.7 |
| II. | Occult. | Reapp. | 25 | 10 | 39 | |
| IV. | Shadow | Ingress W. | 25 | 15 | 18 | |
| IV. | Shadow | Egress | 25 | 18 | 36 | |
| I. | Shadow | Ingress | 25 | 21 | 54 | |
| I. | Transit | Ingress | 25 | 23 | 9 | |
| I. | Shadow | Egress | 26 | 0 | 11 | |
| I. | Transit | Egress | 26 | 1 | 26 | |
| IV. | Transit | Ingress | 26 | 3 | 19 | |
| IV. | Transit | Egress | 26 | 5 | 45 | |
| I. | Eclipse | Disapp. | 26 | 19 | 6 | 40.9 |
| I. | Occult. | Reapp. | 26 | 22 | 35 | |
| II. | Shadow | Ingress | 26 | 23 | 39 | |
| II. | Transit | Ingress | 27 | 2 | 12 | |
| II. | Shadow | Egress | 27 | 2 | 31 | |
| II. | Transit | Egress | 27 | 5 | 1 | |
| III. | Eclipse | Disapp | 27 | 9 | 35 | 51.2 |
| III. | Eclipse | Reapp. | 27 | 12 | 42 | 59.4 |
| III. | Occult. | Disapp. W. | 27 | 14 | 37 | |
| I. | Shadow | Ingress | 27 | 16 | 23 | |
| I. | Transit | Ingress | 27 | 17 | 38 | |
| III. | Occult. | Reapp. | 27 | 17 | 48 | |

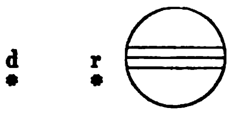
| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Egress | 27 | 18 | 40 | |
| I. | Transit | Egress | 27 | 19 | 55 | |
| I. | Eclipse | Disapp. | 28 | 13 | 35 | 7.3 |
| I. | Occult. | Reapp. | 28 | 17 | 5 | |
| II. | Eclipse | Disapp. | 28 | 18 | 38 | 42.4 |
| II. | Occult. | Reapp. | 29 | 0 | 0 | |
| I. | Shadow | Ingress | 29 | 10 | 51 | |
| I. | Transit | Ingress | 29 | 12 | 8 | |
| I. | Shadow | Egress | 29 | 13 | 8 | |
| I. | Transit | Egress W. | 29 | 14 | 25 | |
| I. | Eclipse | Disapp. | 30 | 8 | 3 | 33.5 |
| I. | Occult. | Reapp. | 30 | 11 | 34 | |
| II. | Shadow | Ingress | 30 | 12 | 56 | |
| II. | Transit | Ingress W. | 30 | 15 | 33 | |
| II. | Shadow | Egress W. | 30 | 15 | 48 | |
| II. | Transit | Egress | 30 | 18 | 21 | |
| III. | Shadow | Ingress | 30 | 23 | 42 | |
| III. | Shadow | Egress | 31 | 3 | 0 | |
| III. | Transit | Ingress | 31 | 4 | 57 | |
| I. | Shadow | Ingress | 31 | 5 | 20 | |
| I. | Transit | Ingress | 31 | 6 | 37 | |
| I. | Shadow | Egress | 31 | 7 | 37 | |
| III. | Transit | Egress | 31 | 8 | 4 | |
| I. | Transit | Egress | 31 | 8 | 53 | |

## Phases of the Eclipses of the Satellites for an Inverting Telescope.

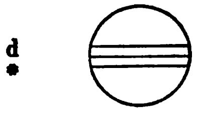
I.



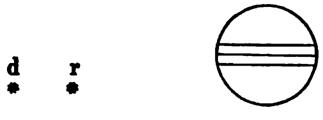
III.



II.



IV.



## JUNE.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 1 | 2 | 32 | 2.3 |
| I. | Occult. | Reapp. | 1 | 6 | 4 | |
| II. | Eclipse | Disapp. | 1 | 7 | 57 | 39.5 |
| II. | Occult. | Reapp. | 1 | 13 | 23 | |

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Ingress | 1 | 23 | 48 | |
| I. | Transit | Ingress | 2 | 1 | 7 | |
| I. | Shadow | Egress | 2 | 2 | 5 | |
| I. | Transit | Egress | 2 | 3 | 23 | |

## WASHINGTON MEAN TIME.

### JUNE.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 2 | 21 | 0 | 27.5 |
| IV. | Eclipse | Disapp. | 2 | 22 | 46 | 51.6 |
| I. | Occult. | Reapp. | 3 | 0 | 33 | |
| IV. | Eclipse | Reapp. | 3 | 1 | 42 | 7.4 |
| II. | Shadow | Ingress | 3 | 2 | 13 | |
| II. | Transit | Ingress | 3 | 4 | 54 | |
| II. | Shadow | Egress | 3 | 5 | 5 | |
| II. | Transit | Egress | 3 | 7 | 42 | |
| IV. | Occult. | Disapp. | 3 | 11 | 31 | |
| III. | Eclipse | Disapp. | 3 | 13 | 36 | 20.5 |
| IV. | Occult. | Reapp. | 3 | 13 | 36 | |
| III. | Eclipse | Reapp. | 3 | 16 | 42 | 33.5 |
| I. | Shadow | Ingress | 3 | 18 | 17 | |
| III. | Occult. | Disapp. | 3 | 18 | 52 | |
| I. | Transit | Ingress | 3 | 19 | 37 | |
| I. | Shadow | Egress | 3 | 20 | 34 | |
| I. | Transit | Egress | 3 | 21 | 53 | |
| III. | Occult. | Reapp. | 3 | 21 | 59 | |
| I. | Eclipse | Disapp. W. | 4 | 15 | 28 | 54.4 |
| I. | Occult. | Reapp. | 4 | 19 | 2 | |
| II. | Eclipse | Disapp. | 4 | 21 | 15 | 41.5 |
| II. | Occult. | Reapp. | 5 | 2 | 43 | |
| I. | Shadow | Ingress | 5 | 12 | 45 | |
| I. | Transit | Ingress W. | 5 | 14 | 6 | |
| I. | Shadow | Egress W. | 5 | 15 | 2 | |
| I. | Transit | Egress | 5 | 16 | 22 | |
| I. | Eclipse | Disapp. | 6 | 9 | 57 | 19.7 |
| I. | Occult. | Reapp. | 6 | 13 | 31 | |
| II. | Shadow | Ingress W | 6 | 15 | 31 | |
| II. | Transit | Ingress | 6 | 18 | 14 | |
| II. | Shadow | Egress | 6 | 18 | 22 | |
| II. | Transit | Egress | 6 | 21 | 2 | |
| III. | Shadow | Ingress | 7 | 3 | 43 | |
| III. | Shadow | Egress | 7 | 7 | 1 | |
| I. | Shadow | Ingress | 7 | 7 | 14 | |
| I. | Transit | Ingress | 7 | 8 | 35 | |
| III. | Transit | Ingress | 7 | 9 | 11 | |
| I. | Shadow | Egress | 7 | 9 | 31 | |
| I. | Transit | Egress | 7 | 10 | 50 | |
| III. | Transit | Egress | 7 | 12 | 16 | |
| I. | Eclipse | Disapp | 8 | 4 | 25 | 48.8 |
| I. | Occult. | Reapp. | 8 | 8 | 0 | |
| II. | Eclipse | Disapp. | 8 | 10 | 34 | 32.3 |
| II. | Occult. | Reapp. | 8 | 16 | 5 | |
| I. | Shadow | Ingress | 9 | 1 | 42 | |
| I. | Transit | Ingress | 9 | 3 | 4 | |
| I. | Shadow | Egress | 9 | 3 | 59 | |
| I. | Transit | Egress | 9 | 5 | 20 | |
| I. | Eclipse | Disapp. | 9 | 22 | 54 | 13.9 |
| I. | Occult. | Reapp. | 10 | 2 | 29 | |
| II. | Shadow | Ingress | 10 | 4 | 48 | |
| II. | Transit | Ingress | 10 | 7 | 34 | |
| II. | Shadow | Egress | 10 | 7 | 40 | |
| II. | Transit | Egress | 10 | 10 | 21 | |
| III. | Eclipse | Disapp. | 10 | 17 | 36 | 44.6 |
| I. | Shadow | Ingress | 10 | 20 | 11 | |
| III. | Eclipse | Reapp. | 10 | 20 | 42 | 1.6 |
| I. | Transit | Ingress | 10 | 21 | 33 | |
| I. | Shadow | Egress | 10 | 22 | 28 | |
| III. | Occult. | Disapp. | 10 | 23 | 4 | |
| I. | Transit | Egress | 10 | 23 | 48 | |
| III. | Occult. | Reapp. | 11 | 2 | 8 | |
| IV. | Shadow | Ingress | 11 | 9 | 34 | |
| IV. | Shadow | Egress | 11 | 12 | 43 | |
| I. | Eclipse | Disapp. | 11 | 17 | 22 | 41.0 |
| I. | Occult. | Reapp. | 11 | 20 | 58 | |
| IV. | Transit | Ingress | 11 | 23 | 2 | |
| II. | Eclipse | Disapp. | 11 | 23 | 52 | 31.5 |
| IV. | Transit | Egress | 12 | 0 | 43 | |
| II. | Occult. | Reapp. | 12 | 5 | 25 | |
| I. | Shadow | Ingress W. | 12 | 14 | 39 | |
| I. | Transit | Ingress | 12 | 16 | 2 | |
| I. | Shadow | Egress | 12 | 16 | 56 | |
| I. | Transit | Egress | 12 | 18 | 18 | |
| I. | Eclipse | Disapp. | 13 | 11 | 51 | 6.3 |
| I. | Occult. | Reapp. W. | 13 | 15 | 27 | |
| II. | Shadow | Ingress | 13 | 18 | 6 | |
| II. | Transit | Ingress | 13 | 20 | 54 | |
| II. | Shadow | Egress | 13 | 20 | 57 | |
| II. | Transit | Egress | 13 | 23 | 41 | |
| III. | Shadow | Ingress | 14 | 7 | 45 | |
| I. | Shadow | Ingress | 14 | 9 | 8 | |
| I. | Transit | Ingress | 14 | 10 | 31 | |
| III. | Shadow | Egress | 14 | 11 | 1 | |
| I. | Shadow | Egress | 14 | 11 | 25 | |
| I. | Transit | Egress | 14 | 12 | 46 | |
| III. | Transit | Ingress | 14 | 13 | 23 | |
| III. | Transit | Egress | 14 | 16 | 25 | |
| I. | Eclipse | Disapp. | 15 | 6 | 19 | 35.8 |
| I. | Occult. | Reapp. | 15 | 9 | 56 | |
| II. | Eclipse | Disapp. | 15 | 13 | 11 | 15.9 |
| II. | Occult. | Reapp. | 15 | 18 | 45 | |
| I. | Shadow | Ingress | 16 | 3 | 36 | |
| I. | Transit | Ingress | 16 | 5 | 0 | |
| I. | Shadow | Egress | 16 | 5 | 53 | |
| I. | Transit | Egress | 16 | 7 | 16 | |
| I. | Eclipse | Disapp. | 17 | 0 | 48 | 0.8 |
| I. | Occult. | Reapp. | 17 | 4 | 25 | |

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| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II. | Shadow | Ingress | 17 | 7 | 24 | | I. | Eclipse | Disapp. | 24 | 2 | 41 | 48.4 |
| II. | Transit | Ingress | 17 | 10 | 13 | | I. | Occult. | Reapp. | 24 | 6 | 20 | |
| II. | Shadow | Egress | 17 | 10 | 14 | | II. | Shadow | Ingress | 24 | 9 | 59 | |
| II. | Transit | Egress | 17 | 13 | 0 | | II. | Shadow | Egress W. | 24 | 12 | 49 | |
| III. | Eclipse | Disapp. | 17 | 21 | 37 | 21.9 | II. | Transit | Ingress W. | 24 | 12 | 50 | |
| I. | Shadow | Ingress | 17 | 22 | 5 | | II. | Transit | Egress W. | 24 | 15 | 36 | |
| I. | Transit | Ingress | 17 | 23 | 29 | | I. | Shadow | Ingress | 24 | 23 | 59 | |
| I. | Shadow | Egress | 18 | 0 | 22 | | I. | Transit | Ingress | 25 | 1 | 24 | |
| III. | Eclipse | Reapp. | 18 | 0 | 41 | 42.1 | III. | Eclipse | Disapp. | 25 | 1 | 38 | 5.2 |
| I. | Transit | Egress | 18 | 1 | 44 | | I. | Shadow | Egress | 25 | 2 | 16 | |
| III. | Occult. | Disapp. | 18 | 3 | 13 | | I. | Transit | Egress | 25 | 3 | 39 | |
| III. | Occult. | Reapp. | 18 | 6 | 15 | | III. | Eclipse | Reapp. | 25 | 4 | 41 | 28.0 |
| I. | Eclipse | Disapp. | 18 | 19 | 16 | 28.3 | III. | Occult. | Disapp. | 25 | 7 | 19 | |
| I. | Occult. | Reapp. | 18 | 22 | 54 | | III. | Occult. | Reapp. | 25 | 10 | 17 | |
| II. | Eclipse | Disapp. | 19 | 2 | 29 | 12.3 | I. | Eclipse | Disapp. | 25 | 21 | 10 | 16.2 |
| II. | Eclipse | Reapp. | 19 | 5 | 15 | 22.5 | I. | Occult. | Reapp. | 26 | 0 | 48 | |
| II. | Occult. | Disapp. | 19 | 5 | 17 | | II. | Eclipse | Disapp. | 26 | 5 | 5 | 43.7 |
| II. | Occult. | Reapp. | 19 | 8 | 4 | | II. | Eclipse | Reapp. | 26 | 7 | 51 | 31.7 |
| I. | Shadow | Ingress | 19 | 16 | 33 | | II. | Occult. | Disapp. | 26 | 7 | 55 | |
| IV. | Eclipse | Disapp. | 19 | 17 | 5 | 20.2 | II. | Occult. | Reapp. | 26 | 10 | 41 | |
| I. | Transit | Ingress | 19 | 17 | 58 | | I. | Shadow | Ingress | 26 | 18 | 27 | |
| I. | Shadow | Egress | 19 | 18 | 50 | | I. | Transit | Ingress | 26 | 19 | 53 | |
| IV. | Eclipse | Reapp. | 19 | 19 | 48 | 56.0 | I. | Shadow | Egress | 26 | 20 | 44 | |
| I. | Transit | Egress | 19 | 20 | 14 | | I. | Transit | Egress | 26 | 22 | 8 | |
| IV. | Occult. | Disapp. | 20 | 7 | 1 | | I. | Eclipse | Disapp W. | 27 | 15 | 38 | 41.5 |
| IV. | Occult. | Reapp. | 20 | 8 | 10 | | I. | Occult. | Reapp. | 27 | 19 | 17 | |
| I. | Eclipse | Disapp. W. | 20 | 13 | 44 | 53.2 | II. | Shadow | Ingress | 27 | 23 | 16 | |
| I. | Occult. | Reapp. | 20 | 17 | 22 | | II. | Shadow | Egress | 28 | 2 | 7 | |
| II. | Shadow | Ingress | 20 | 20 | 41 | | II. | Transit | Ingress | 28 | 2 | 8 | |
| II. | Transit | Ingress | 20 | 23 | 31 | | IV. | Shadow | Ingress | 28 | 3 | 52 | |
| II. | Shadow | Egress | 20 | 23 | 32 | | II. | Transit | Egress | 28 | 4 | 54 | |
| II. | Transit | Egress | 21 | 2 | 18 | | IV. | Shadow | Egress | 28 | 6 | 49 | |
| I. | Shadow | Ingress | 21 | 11 | 2 | | I. | Shadow | Ingress W. | 28 | 12 | 56 | |
| III. | Shadow | Ingress | 21 | 11 | 46 | | I. | Transit | Ingress W. | 28 | 14 | 21 | |
| I. | Transit | Ingress | 21 | 12 | 26 | | I. | Shadow | Egress W. | 28 | 15 | 13 | |
| I. | Shadow | Egress W. | 21 | 13 | 19 | | III. | Shadow | Ingress W. | 28 | 15 | 46 | |
| I. | Transit | Egress W. | 21 | 14 | 42 | | I. | Transit | Egress | 28 | 16 | 36 | |
| III. | Shadow | Egress W. | 21 | 15 | 1 | | III. | Shadow | Egress | 28 | 19 | 1 | |
| III. | Transit | Ingress | 21 | 17 | 31 | | III. | Transit | Ingress | 28 | 21 | 34 | |
| III. | Transit | Egress | 21 | 20 | 31 | | III. | Transit | Egress | 29 | 0 | 31 | |
| I. | Eclipse | Disapp. | 22 | 8 | 13 | 23.0 | I. | Eclipse | Disapp. | 29 | 10 | 7 | 10.6 |
| I. | Occult. | Reapp. | 22 | 11 | 51 | | I. | Occult. | Reapp. W. | 29 | 13 | 45 | |
| II. | Eclipse | Disapp. W. | 22 | 15 | 47 | 49.9 | II. | Eclipse | Disapp. | 29 | 18 | 24 | 14.6 |
| II. | Eclipse | Reapp. | 22 | 18 | 33 | 49.1 | II. | Eclipse | Reapp. | 29 | 21 | 9 | 51.4 |
| II. | Occult. | Disapp. | 22 | 18 | 37 | | II. | Occult. | Disapp. | 29 | 21 | 14 | |
| II. | Occult. | Reapp. | 22 | 21 | 23 | | II. | Occult. | Reapp. | 30 | 0 | 0 | |
| I. | Shadow | Ingress | 23 | 5 | 30 | | I. | Shadow | Ingress | 30 | 7 | 24 | |
| I. | Transit | Ingress | 23 | 6 | 55 | | I. | Transit | Ingress | 30 | 8 | 50 | |
| I. | Shadow | Egress | 23 | 7 | 47 | | I. | Shadow | Egress | 30 | 9 | 41 | |
| I. | Transit | Egress | 23 | 9 | 10 | | I. | Transit | Egress | 30 | 11 | 5 | |

## WASHINGTON MEAN TIME.

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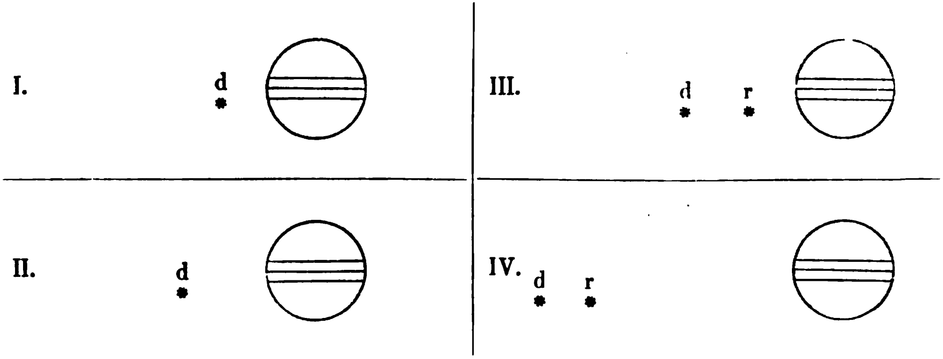
### Phases of the Eclipses of the Satellites for an Inverting Telescope.



## JULY.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 1 | 4 | 35 | 37.3 | I. | Shadow | Egress | 5 | 17 | 7 | |
| I. | Occult. | Reapp. | 1 | 8 | 13 | | I. | Transit | Egress | 5 | 18 | 30 | |
| II. | Shadow | Ingress W. | 1 | 12 | 33 | | III. | Shadow | Ingress | 5 | 19 | 47 | |
| II. | Shadow | Egress W. | 1 | 15 | 24 | | III. | Shadow | Ingress | 5 | 23 | 1 | |
| II. | Transit | Ingress W. | 1 | 15 | 25 | | III. | Transit | Egress | 6 | 1 | 33 | |
| II. | Transit | Egress | 1 | 18 | 10 | | III. | Transit | Egress | 6 | 4 | 28 | |
| I. | Shadow | Ingress | 2 | 1 | 53 | | IV. | Eclipse | Disapp. | 6 | 11 | 23 | 59.3 |
| I. | Transit | Ingress | 2 | 3 | 18 | | I. | Eclipse | Disapp. | 6 | 12 | 1 | 2.3 |
| I. | Shadow | Egress | 2 | 4 | 10 | | IV. | Eclipse | Reapp. W. | 6 | 13 | 54 | 47.7 |
| I. | Transit | Egress | 2 | 5 | 33 | | I. | Occult. | Reapp. W. | 6 | 15 | 38 | |
| III. | Eclipse | Disapp. | 2 | 5 | 39 | 28.5 | II. | Eclipse | Disapp. | 6 | 21 | 0 | 30.5 |
| III. | Eclipse | Reapp. | 2 | 8 | 41 | 53.3 | II. | Eclipse | Reapp. | 6 | 23 | 45 | 44.5 |
| III. | Occult. | Disapp. | 2 | 11 | 21 | | II. | Occult. | Disapp. | 6 | 23 | 48 | |
| III. | Occult. | Reapp. W. | 2 | 14 | 17 | | II. | Occult. | Reapp. | 7 | 2 | 34 | |
| I. | Eclipse | Disapp. | 2 | 23 | 4 | 5.7 | I. | Shadow | Ingress | 7 | 9 | 18 | |
| I. | Occult. | Reapp. | 3 | 2 | 42 | | I. | Transit | Ingress | 7 | 10 | 43 | |
| II. | Eclipse | Disapp. | 3 | 7 | 42 | 5.9 | I. | Shadow | Egress | 7 | 11 | 35 | |
| II. | Eclipse | Reapp. | 3 | 10 | 27 | 31.3 | I. | Transit | Egress W. | 7 | 12 | 58 | |
| II. | Occult. | Disapp. | 3 | 10 | 31 | | I. | Eclipse | Disapp. | 8 | 6 | 29 | 28.5 |
| II. | Occult. | Reapp. W. | 3 | 13 | 17 | | I. | Occult. | Reapp. | 8 | 10 | 6 | |
| I. | Shadow | Ingress | 3 | 20 | 21 | | II. | Shadow | Ingress W. | 8 | 15 | 9 | |
| I. | Transit | Ingress | 3 | 21 | 47 | | II. | Transit | Ingress | 8 | 17 | 58 | |
| I. | Shadow | Egress | 3 | 22 | 38 | | II. | Shadow | Egress | 8 | 17 | 59 | |
| I. | Transit | Egress | 4 | 0 | 2 | | II. | Transit | Egress | 8 | 20 | 43 | |
| I. | Eclipse | Disapp. | 4 | 17 | 32 | 31.4 | I. | Shadow | Ingress | 9 | 3 | 47 | |
| I. | Occult. | Reapp. | 4 | 21 | 10 | | I. | Transit | Ingress | 9 | 5 | 11 | |
| II. | Shadow | Ingress | 5 | 1 | 51 | | I. | Shadow | Egress | 9 | 6 | 4 | |
| II. | Shadow | Egress | 5 | 4 | 42 | | I. | Transit | Egress | 9 | 7 | 26 | |
| II. | Transit | Ingress | 5 | 4 | 42 | | III. | Eclipse | Disapp. | 9 | 9 | 40 | 22.6 |
| II. | Transit | Egress | 5 | 7 | 27 | | III. | Eclipse | Reapp. W. | 9 | 12 | 41 | 48.8 |
| I. | Shadow | Ingress W. | 5 | 14 | 50 | | III. | Occult. | Disapp. W. | 9 | 15 | 18 | |
| I. | Transit | Ingress | 5 | 16 | 15 | | III. | Occult. | Reapp. | 9 | 18 | 12 | |

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| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 10 | 0 | 57 | 57.9 | II. | Eclipse | Disapp. W. | 17 | 12 | 54 | 24.6 |
| I. | Occult. | Reapp. | 10 | 4 | 34 | | II. | Occult. | Reapp. | 17 | 18 | 20 | |
| II. | Eclipse | Disapp. | 10 | 10 | 18 | 19.5 | I. | Shadow | Ingress | 18 | 0 | 10 | |
| II. | Eclipse | Reapp. | 10 | 13 | 3 | 21.9 | I. | Transit | Ingress | 18 | 1 | 31 | |
| II. | Occult. | Disapp. | 10 | 13 | 5 | | I. | Shadow | Egress | 18 | 2 | 27 | |
| II. | Occult. | Reapp. W. | 10 | 15 | 50 | | I. | Transit | Egress | 18 | 3 | 46 | |
| I. | Shadow | Ingress | 10 | 22 | 15 | | I. | Eclipse | Disapp. | 18 | 21 | 20 | 20.0 |
| I. | Transit | Ingress | 10 | 23 | 39 | | I. | Occult. | Reapp. | 19 | 0 | 54 | |
| I. | Shadow | Egress | 11 | 0 | 32 | | II. | Shadow | Ingress | 19 | 7 | 3 | |
| I. | Transit | Egress | 11 | 1 | 54 | | II. | Transit | Ingress | 19 | 9 | 45 | |
| I. | Eclipse | Disapp. | 11 | 19 | 26 | 23.8 | II. | Shadow | Egress | 19 | 9 | 52 | |
| I. | Occult. | Reapp. | 11 | 23 | 2 | | II. | Transit | Egress W. | 19 | 12 | 29 | |
| II. | Shadow | Ingress | 12 | 4 | 27 | | I. | Shadow | Ingress | 19 | 18 | 38 | |
| II. | Transit | Ingress | 12 | 7 | 14 | | I. | Transit | Ingress | 19 | 19 | 59 | |
| II. | Shadow | Egress | 12 | 7 | 17 | | I. | Shadow | Egress | 19 | 20 | 54 | |
| II. | Transit | Egress | 12 | 9 | 59 | | I. | Transit | Egress | 19 | 22 | 14 | |
| I. | Shadow | Ingress | 12 | 16 | 44 | | III. | Shadow | Ingress | 20 | 3 | 48 | |
| I. | Transit | Ingress | 12 | 18 | 7 | | III. | Shadow | Egress | 20 | 7 | 0 | |
| I. | Shadow | Egress | 12 | 19 | 1 | | III. | Transit | Ingress | 20 | 9 | 18 | |
| I. | Transit | Egress | 12 | 20 | 22 | | III. | Transit | Ingress W. | 20 | 12 | 9 | |
| III. | Shadow | Ingress | 12 | 23 | 48 | | I. | Eclipse | Disapp. W. | 20 | 15 | 48 | 53.0 |
| III. | Shadow | Egress | 13 | 3 | 1 | | I. | Occult. | Reapp. | 20 | 19 | 21 | |
| III. | Transit | Ingress | 13 | 5 | 28 | | II. | Eclipse | Disapp. | 21 | 2 | 12 | 36.5 |
| III. | Transit | Egress | 13 | 8 | 20 | | II. | Occult. | Reapp. | 21 | 7 | 35 | |
| I. | Eclipse | Disapp. W. | 13 | 13 | 54 | 55.9 | I. | Shadow | Ingress W. | 21 | 13 | 7 | |
| I. | Occult. | Reapp. | 13 | 17 | 30 | | I. | Transit | Ingress W. | 21 | 14 | 27 | |
| II. | Eclipse | Disapp. | 13 | 23 | 36 | 37.5 | I. | Shadow | Egress W. | 21 | 15 | 23 | |
| II. | Occult. | Reapp. | 14 | 5 | 6 | | I. | Transit | Egress | 21 | 16 | 42 | |
| I. | Shadow | Ingress | 14 | 11 | 12 | | I. | Eclipse | Disapp. | 22 | 10 | 17 | 20.9 |
| I. | Transit | Ingress W. | 14 | 12 | 35 | | I. | Occult. | Reapp. W. | 22 | 13 | 48 | |
| I. | Shadow | Egress W. | 14 | 13 | 29 | | II. | Shadow | Ingress | 22 | 20 | 20 | |
| I. | Transit | Egress W. | 14 | 14 | 50 | | II. | Transit | Ingress | 22 | 22 | 59 | |
| IV. | Shadow | Ingress | 14 | 22 | 10 | | II. | Shadow | Egress | 22 | 23 | 10 | |
| IV. | Shadow | Egress | 15 | 0 | 55 | | II. | Transit | Egress | 23 | 1 | 43 | |
| I. | Eclipse | Disapp. | 15 | 8 | 23 | 20.8 | IV. | Eclipse | Disapp. | 23 | 5 | 43 | 32.0 |
| I. | Occult. | Reapp. W. | 15 | 11 | 58 | | I. | Shadow | Ingress | 23 | 7 | 36 | |
| II. | Shadow | Ingress | 15 | 17 | 45 | | IV. | Eclipse | Reapp. | 23 | 8 | 0 | 7.8 |
| II. | Transit | Ingress | 15 | 20 | 30 | | I. | Transit | Ingress | 23 | 8 | 54 | |
| II. | Shadow | Egress | 15 | 20 | 34 | | I. | Shadow | Egress | 23 | 9 | 52 | |
| II. | Transit | Egress | 15 | 23 | 14 | | I. | Transit | Egress W. | 23 | 11 | 9 | |
| I. | Shadow | Ingress | 16 | 5 | 41 | | III. | Eclipse | Disapp. | 23 | 17 | 42 | 10.5 |
| I. | Transit | Ingress | 16 | 7 | 3 | | III. | Eclipse | Reapp. | 23 | 20 | 41 | 37.7 |
| I. | Shadow | Egress | 16 | 7 | 58 | | III. | Occult. | Disapp. | 23 | 22 | 59 | |
| I. | Transit | Egress | 16 | 9 | 18 | | III. | Occult. | Reapp. | 24 | 1 | 49 | |
| III. | Eclipse | Disapp. W. | 16 | 13 | 41 | 29.7 | I. | Eclipse | Disapp. | 24 | 4 | 45 | 52.3 |
| III. | Eclipse | Reapp. | 16 | 16 | 41 | 56.7 | I. | Occult. | Reapp. | 24 | 8 | 16 | |
| III. | Occult. | Disapp. | 16 | 19 | 11 | | II. | Eclipse | Disapp. W. | 24 | 15 | 30 | 22.0 |
| III. | Occult. | Reapp. | 16 | 22 | 3 | | II. | Occult. | Reapp. | 24 | 20 | 49 | |
| I. | Eclipse | Disapp. | 17 | 2 | 51 | 53.3 | I. | Shadow | Ingress | 25 | 2 | 4 | |
| I. | Occult. | Reapp. | 17 | 6 | 26 | | I. | Transit | Ingress | 25 | 3 | 22 | |

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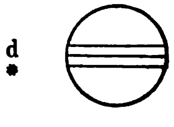
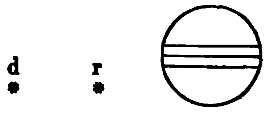
| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Egress | 25 | 4 | 20 | |
| I. | Transit | Egress | 25 | 5 | 37 | |
| I. | Eclipse | Disapp. | 25 | 23 | 14 | 20.1 |
| I. | Occult. | Reapp. | 26 | 2 | 44 | |
| II. | Shadow | Ingress | 26 | 9 | 38 | |
| II. | Transit | Ingress W. | 26 | 12 | 13 | |
| II. | Shadow | Egress W. | 26 | 12 | 28 | |
| II. | Transit | Egress W. | 26 | 14 | 57 | |
| I. | Shadow | Ingress | 26 | 20 | 33 | |
| I. | Transit | Ingress | 26 | 21 | 50 | |
| I. | Shadow | Egress | 26 | 22 | 49 | |
| I. | Transit | Egress | 27 | 0 | 5 | |
| III. | Shadow | Ingress | 27 | 7 | 50 | |
| III. | Shadow | Egress W. | 27 | 11 | 1 | |
| III. | Transit | Ingress W. | 27 | 13 | 4 | |
| III. | Transit | Egress W. | 27 | 15 | 53 | |
| I. | Eclipse | Disapp. | 27 | 17 | 42 | 54.1 |
| I. | Occult. | Reapp. | 27 | 21 | 12 | |
| II. | Eclipse | Disapp. | 28 | 4 | 48 | 28.2 |
| II. | Occult. | Reapp. | 28 | 10 | 2 | |
| I. | Shadow | Ingress W. | 28 | 15 | 1 | |
| I. | Transit | Ingress | 28 | 16 | 17 | |
| I. | Shadow | Egress | 28 | 17 | 17 | |
| I. | Transit | Egress | 28 | 18 | 32 | |
| I. | Eclipse | Disapp. W. | 29 | 12 | 11 | 23.3 |
| I. | Occult. | Reapp. W. | 29 | 15 | 39 | |
| II. | Shadow | Ingress | 29 | 22 | 56 | |
| II. | Transit | Ingress | 30 | 1 | 26 | |
| II. | Shadow | Egress | 30 | 1 | 45 | |
| II. | Transit | Egress | 30 | 4 | 9 | |
| I. | Shadow | Ingress | 30 | 9 | 30 | |
| I. | Transit | Ingress W. | 30 | 10 | 44 | |
| I. | Shadow | Egress W. | 30 | 11 | 46 | |
| I. | Transit | Egress W. | 30 | 12 | 59 | |
| III. | Eclipse | Disapp. | 30 | 21 | 42 | 51.4 |
| III. | Eclipse | Reapp. | 31 | 0 | 41 | 18.2 |
| III. | Occult. | Disapp. | 31 | 2 | 42 | |
| III. | Occult. | Reapp. | 31 | 5 | 30 | |
| I. | Eclipse | Disapp. | 31 | 6 | 39 | 56.2 |
| I. | Occult. | Reapp. | 31 | 10 | 6 | |
| IV. | Shadow | Ingress | 31 | 16 | 29 | |
| II. | Eclipse | Disapp. | 31 | 18 | 6 | 12.1 |
| IV. | Shadow | Egress | 31 | 19 | 1 | |
| II. | Occult. | Reapp. | 31 | 23 | 15 | |

**Phases of the Eclipses of the Satellites for an Inverting Telescope.**

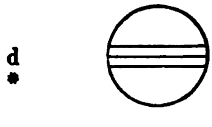
I.



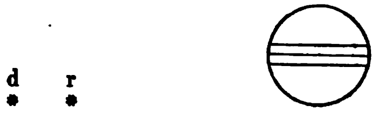
III.



II.



IV.



### AUGUST.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Ingress | 1 | 3 | 58 | |
| I. | Transit | Ingress | 1 | 5 | 11 | |
| I. | Shadow | Egress | 1 | 6 | 14 | |
| I. | Transit | Egress | 1 | 7 | 26 | |
| I. | Eclipse | Disapp. | 2 | 1 | 8 | 25.2 |
| I. | Occult. | Reapp. | 2 | 4 | 33 | |
| II. | Shadow | Ingress W. | 2 | 12 | 14 | |
| II. | Transit | Ingress W. | 2 | 14 | 40 | |
| II. | Shadow | Egress W. | 2 | 15 | 3 | |
| II. | Transit | Egress | 2 | 17 | 22 | |
| I. | Shadow | Ingress | 2 | 22 | 27 | |
| I. | Transit | Ingress | 2 | 23 | 38 | |
| I. | Shadow | Egress | 3 | 0 | 43 | |
| I. | Transit | Egress | 3 | 1 | 53 | |

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| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| III. | Shadow | Ingress W. | 3 | 11 | 51 | |
| III. | Shadow | Egress W. | 3 | 15 | 1 | |
| III. | Transit | Ingress | 3 | 16 | 45 | |
| III. | Transit | Egress | 3 | 19 | 32 | |
| I. | Eclipse | Disapp. | 3 | 19 | 37 | 0.5 |
| I. | Occult. | Reapp. | 3 | 23 | 0 | |
| II. | Eclipse | Disapp. | 4 | 7 | 24 | 13.0 |
| II. | Occult. | Reapp. W. | 4 | 12 | 27 | |
| I. | Shadow | Ingress | 4 | 16 | 55 | |
| I. | Transit | Ingress | 4 | 18 | 5 | |
| I. | Shadow | Egress | 4 | 19 | 11 | |
| I. | Transit | Egress | 4 | 20 | 20 | |
| I. | Eclipse | Disapp. W. | 5 | 14 | 5 | 21.1 |
| I. | Occult. | Reapp. | 5 | 17 | 27 | |
| II. | Shadow | Ingress | 6 | 1 | 32 | |
| II. | Transit | Ingress | 6 | 3 | 51 | |
| II. | Shadow | Egress | 6 | 4 | 21 | |
| II. | Transit | Egress | 6 | 6 | 34 | |
| I. | Shadow | Ingress W. | 6 | 11 | 24 | |
| I. | Transit | Ingress W. | 6 | 12 | 32 | |
| I. | Shadow | Egress W. | 6 | 13 | 40 | |
| I. | Transit | Egress W. | 6 | 14 | 47 | |
| III. | Eclipse | Disapp. | 7 | 1 | 43 | 52.1 |
| III. | Eclipse | Reapp. | 7 | 4 | 41 | 18.1 |
| III. | Occult. | Disapp. | 7 | 6 | 20 | |
| I. | Eclipse | Disapp. | 7 | 8 | 34 | 5.4 |
| III. | Occult. | Reapp. | 7 | 9 | 7 | |
| I. | Occult. | Reapp. W. | 7 | 11 | 54 | |
| II. | Eclipse | Disapp. | 7 | 20 | 41 | 55.9 |
| II. | Occult. | Reapp. | 8 | 1 | 38 | |
| I. | Shadow | Ingress | 8 | 5 | 52 | |
| I. | Transit | Ingress | 8 | 6 | 59 | |
| I. | Shadow | Egress | 8 | 8 | 8 | |
| I. | Transit | Egress | 8 | 9 | 14 | |
| IV. | Eclipse | Disapp. | 9 | 0 | 4 | 46.1 |
| IV. | Eclipse | Reapp. | 9 | 2 | 5 | 10.9 |
| I. | Eclipse | Disapp. | 9 | 3 | 2 | 35.6 |
| I. | Occult. | Reapp. | 9 | 6 | 21 | |
| II. | Shadow | Ingress W. | 9 | 14 | 49 | |
| II. | Transit | Ingress | 9 | 17 | 3 | |
| II. | Shadow | Egress | 9 | 17 | 38 | |
| II. | Transit | Egress | 9 | 19 | 46 | |
| I. | Shadow | Ingress | 10 | 0 | 21 | |
| I. | Transit | Ingress | 10 | 1 | 26 | |
| I. | Shadow | Egress | 10 | 2 | 37 | |
| I. | Transit | Egress | 10 | 3 | 40 | |
| III. | Shadow | Ingress W. | 10 | 15 | 52 | |
| III. | Shadow | Egress | 10 | 19 | 1 | |
| III. | Transit | Ingress | 10 | 20 | 21 | |
| I. | Eclipse | Disapp. | 10 | 21 | 31 | 12.5 |
| III. | Transit | Egress | 10 | 23 | 7 | |
| I. | Occult. | Reapp. | 11 | 0 | 48 | |
| II. | Eclipse | Disapp. W. | 11 | 9 | 59 | 52.3 |
| II. | Occult. | Reapp. W. | 11 | 14 | 49 | |
| I. | Shadow | Ingress | 11 | 18 | 49 | |
| I. | Transit | Ingress | 11 | 19 | 53 | |
| I. | Shadow | Egress | 11 | 21 | 5 | |
| I. | Transit | Egress | 11 | 22 | 7 | |
| I. | Eclipse | Disapp. W. | 12 | 15 | 59 | 44.6 |
| I. | Occult. | Reapp. | 12 | 19 | 15 | |
| II. | Shadow | Ingress | 13 | 4 | 8 | |
| II. | Transit | Ingress | 13 | 6 | 13 | |
| II. | Shadow | Egress | 13 | 6 | 57 | |
| II. | Transit | Egress | 13 | 8 | 56 | |
| I. | Shadow | Ingress W. | 13 | 13 | 18 | |
| I. | Transit | Ingress W. | 13 | 14 | 20 | |
| I. | Shadow | Egress W. | 13 | 15 | 34 | |
| I. | Transit | Egress | 13 | 16 | 34 | |
| III. | Eclipse | Disapp. | 14 | 5 | 45 | 2.9 |
| III. | Eclipse | Reapp. | 14 | 8 | 41 | 27.5 |
| III. | Occult. | Disapp. W. | 14 | 9 | 54 | |
| I. | Eclipse | Disapp. W. | 14 | 10 | 28 | 20.8 |
| III. | Occult. | Reapp. W. | 14 | 12 | 39 | |
| I. | Occult. | Reapp. W. | 14 | 13 | 42 | |
| II. | Eclipse | Disapp. | 14 | 23 | 17 | 34.4 |
| II. | Occult. | Reapp. | 15 | 4 | 0 | |
| I. | Shadow | Ingress | 15 | 7 | 46 | |
| I. | Transit | Ingress | 15 | 8 | 47 | |
| I. | Shadow | Egress W. | 15 | 10 | 2 | |
| I. | Transit | Egress W. | 15 | 11 | 1 | |
| I. | Eclipse | Disapp. | 16 | 4 | 56 | 52.4 |
| I. | Occult. | Reapp. | 16 | 8 | 9 | |
| II. | Shadow | Ingress | 16 | 17 | 27 | |
| II. | Transit | Ingress | 16 | 19 | 25 | |
| II. | Shadow | Egress | 16 | 20 | 16 | |
| II. | Transit | Egress | 16 | 22 | 7 | |
| I. | Shadow | Ingress | 17 | 2 | 15 | |
| I. | Transit | Ingress | 17 | 3 | 14 | |
| I. | Shadow | Egress | 17 | 4 | 31 | |
| I. | Transit | Egress | 17 | 5 | 28 | |
| IV. | Shadow | Ingress W. | 17 | 10 | 48 | |
| IV. | Shadow | Egress W. | 17 | 13 | 7 | |
| III. | Shadow | Ingress | 17 | 19 | 53 | |
| III. | Shadow | Egress | 17 | 23 | 1 | |
| I. | Eclipse | Disapp. | 17 | 23 | 25 | 31.1 |
| III. | Transit | Ingress | 17 | 23 | 52 | |
| I. | Occult. | Reapp. | 18 | 2 | 36 | |
| III. | Transit | Egress | 18 | 2 | 37 | |

## WASHINGTON MEAN TIME.

### AUGUST.

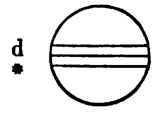
| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II. | Eclipse | Disapp. W. | 18 | 12 | 35 | 26.9 | I. | Occult. | Reapp. | 25 | 4 | 21 | |
| II. | Occult. | Reapp. | 18 | 17 | 9 | | III. | Transit | Egress | 25 | 6 | 2 | |
| I. | Shadow | Ingress | 18 | 20 | 43 | | II. | Eclipse | Disapp. W. | 25 | 15 | 10 | 58.0 |
| I. | Transit | Ingress | 18 | 21 | 41 | | IV. | Eclipse | Disapp. | 25 | 18 | 27 | 26.8 |
| I. | Shadow | Egress | 18 | 22 | 59 | | II. | Occult. | Reapp. | 25 | 19 | 28 | |
| I. | Transit | Egress | 18 | 23 | 55 | | IV. | Eclipse | Reapp. | 25 | 20 | 8 | 58.2 |
| I. | Eclipse | Disapp. | 19 | 17 | 54 | 4.8 | I. | Shadow | Ingress | 25 | 22 | 37 | |
| I. | Occult. | Reapp. | 19 | 21 | 2 | | I. | Transit | Ingress | 25 | 23 | 26 | |
| II. | Shadow | Ingress | 20 | 6 | 45 | | I. | Shadow | Egress | 26 | 0 | 53 | |
| II. | Transit | Ingress | 20 | 8 | 34 | | I. | Transit | Egress | 26 | 1 | 40 | |
| II. | Shadow | Egress W. | 20 | 9 | 34 | | I. | Eclipse | Disapp. | 26 | 19 | 48 | 32.4 |
| II. | Transit | Egress W. | 20 | 11 | 17 | | I. | Occult. | Reapp. | 26 | 22 | 48 | |
| I. | Shadow | Ingress W. | 20 | 15 | 12 | | II. | Shadow | Ingress W. | 27 | 9 | 22 | |
| I. | Transit | Ingress W. | 20 | 16 | 7 | | II. | Transit | Ingress W. | 27 | 10 | 53 | |
| I. | Shadow | Egress | 20 | 17 | 28 | | II. | Shadow | Egress W. | 27 | 12 | 10 | |
| I. | Transit | Egress | 20 | 18 | 21 | | II. | Transit | Egress W. | 27 | 13 | 36 | |
| III. | Eclipse | Disapp. W. | 21 | 9 | 46 | 58.4 | I. | Shadow | Ingress | 27 | 17 | 6 | |
| I. | Eclipse | Disapp. W. | 21 | 12 | 22 | 43.0 | I. | Transit | Ingress | 27 | 17 | 52 | |
| III. | Eclipse | Reapp. W. | 21 | 12 | 42 | 21.0 | I. | Shadow | Egress | 27 | 19 | 22 | |
| III. | Occult. | Disapp. W. | 21 | 13 | 24 | | I. | Transit | Egress | 27 | 20 | 6 | |
| I. | Occult. | Reapp. W. | 21 | 15 | 28 | | III. | Eclipse | Disapp. W. | 28 | 13 | 48 | 28.8 |
| III. | Occult. | Reapp. W. | 21 | 16 | 8 | | I. | Eclipse | Disapp. W. | 28 | 14 | 17 | 12.7 |
| II. | Eclipse | Disapp. | 22 | 1 | 53 | 8.6 | III. | Eclipse | Reapp. W. | 28 | 16 | 42 | 48.8 |
| II. | Occult. | Reapp. | 22 | 6 | 19 | | III. | Occult. | Disapp. | 28 | 16 | 48 | |
| I. | Shadow | Ingress W. | 22 | 9 | 40 | | I. | Occult. | Reapp. | 28 | 17 | 14 | |
| I. | Transit | Ingress W. | 22 | 10 | 33 | | III. | Occult. | Reapp. | 28 | 19 | 32 | |
| I. | Shadow | Egress W. | 22 | 11 | 56 | | II. | Eclipse | Disapp. | 29 | 4 | 28 | 39.7 |
| I. | Transit | Egress W. | 22 | 12 | 47 | | II. | Occult. | Reapp. W. | 29 | 8 | 35 | |
| I. | Eclipse | Disapp. | 23 | 6 | 51 | 16.3 | I. | Shadow | Ingress W. | 29 | 11 | 34 | |
| I. | Occult. | Reapp. W. | 23 | 9 | 54 | | I. | Transit | Ingress W. | 29 | 12 | 18 | |
| II. | Shadow | Ingress | 23 | 20 | 3 | | I. | Shadow | Egress W. | 29 | 13 | 50 | |
| II. | Transit | Ingress | 23 | 21 | 45 | | I. | Transit | Egress W. | 29 | 14 | 32 | |
| II. | Shadow | Egress | 23 | 22 | 52 | | I. | Eclipse | Disapp. W. | 30 | 8 | 45 | 47.8 |
| II. | Transit | Egress | 24 | 0 | 28 | | I. | Occult. | Reapp. W. | 30 | 11 | 40 | |
| I. | Shadow | Ingress | 24 | 4 | 9 | | II. | Shadow | Ingress | 30 | 22 | 41 | |
| I. | Transit | Ingress | 24 | 4 | 59 | | II. | Transit | Ingress | 31 | 0 | 2 | |
| I. | Shadow | Egress | 24 | 6 | 25 | | II. | Shadow | Egress | 31 | 1 | 29 | |
| I. | Transit | Egress | 24 | 7 | 13 | | II. | Transit | Egress | 31 | 2 | 45 | |
| III. | Shadow | Ingress | 24 | 23 | 54 | | I. | Shadow | Ingress | 31 | 6 | 3 | |
| I. | Eclipse | Disapp. | 25 | 1 | 19 | 56.1 | I. | Transit | Ingress | 31 | 6 | 44 | |
| III. | Shadow | Egress | 25 | 3 | 1 | | I. | Shadow | Egress | 31 | 8 | 19 | |
| III. | Transit | Ingress | 25 | 3 | 18 | | I. | Transit | Egress W. | 31 | 8 | 58 | |

## WASHINGTON MEAN TIME.

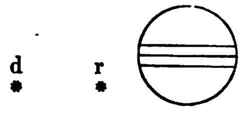
## AUGUST.

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

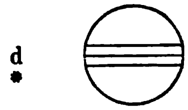
I.



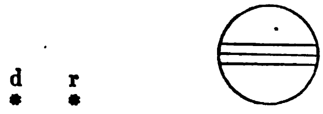
III.



II.



IV.



## SEPTEMBER.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Eclipse | Disapp. | 1 | 3 | 14 | 30.5 | I. | Shadow | Ingress W. | 5 | 13 | 28 | |
| III. | Shadow | Ingress | 1 | 3 | 55 | | I. | Transit | Ingress W. | 5 | 14 | 2 | |
| I. | Occult. | Reapp. | 1 | 6 | 6 | | I. | Shadow | Egress W. | 5 | 15 | 44 | |
| III. | Transit | Ingress | 1 | 6 | 41 | | I. | Transit | Egress W. | 5 | 16 | 16 | |
| III. | Shadow | Egress | 1 | 7 | 1 | | I. | Eclipse | Disapp. W. | 6 | 10 | 40 | 27.5 |
| III. | Transit | Egress W. | 1 | 9 | 24 | | I. | Occult. | Reapp. W. | 6 | 13 | 24 | |
| II. | Eclipse | Disapp. | 1 | 17 | 46 | 26.3 | II. | Shadow | Ingress | 7 | 1 | 17 | |
| II. | Occult. | Reapp. | 1 | 21 | 44 | | II. | Transit | Ingress | 7 | 2 | 19 | |
| I. | Shadow | Ingress | 2 | 0 | 31 | | II. | Shadow | Egress | 7 | 4 | 6 | |
| I. | Transit | Ingress | 2 | 1 | 10 | | II. | Transit | Egress | 7 | 5 | 2 | |
| I. | Shadow | Egress | 2 | 2 | 47 | | I. | Shadow | Ingress W. | 7 | 7 | 57 | |
| I. | Transit | Egress | 2 | 3 | 24 | | I. | Transit | Ingress W. | 7 | 8 | 28 | |
| I. | Eclipse | Disapp. | 2 | 21 | 43 | 8.1 | I. | Shadow | Egress W. | 7 | 10 | 13 | |
| I. | Occult. | Reapp. | 3 | 0 | 32 | | I. | Transit | Egress W. | 7 | 10 | 42 | |
| IV. | Shadow | Ingress | 3 | 5 | 9 | | I. | Eclipse | Disapp. | 8 | 5 | 9 | 12.3 |
| IV. | Shadow | Egress | 3 | 7 | 12 | | I. | Occult. | Reapp. | 8 | 7 | 50 | |
| II. | Shadow | Ingress W. | 3 | 11 | 59 | | III. | Shadow | Ingress W. | 8 | 7 | 56 | |
| II. | Transit | Ingress W. | 3 | 13 | 11 | | III. | Transit | Ingress W. | 8 | 9 | 59 | |
| II. | Shadow | Egress W. | 3 | 14 | 47 | | III. | Shadow | Egress W. | 8 | 11 | 1 | |
| II. | Transit | Egress W. | 3 | 15 | 54 | | III. | Transit | Egress W. | 8 | 12 | 44 | |
| I. | Shadow | Ingress | 3 | 19 | 0 | | II. | Eclipse | Disapp. | 8 | 20 | 21 | 53.4 |
| I. | Transit | Ingress | 3 | 19 | 36 | | II. | Occult. | Reapp. | 8 | 23 | 58 | |
| I. | Shadow | Egress | 3 | 21 | 16 | | I. | Shadow | Ingress | 9 | 2 | 26 | |
| I. | Transit | Egress | 3 | 21 | 50 | | I. | Transit | Ingress | 9 | 2 | 54 | |
| I. | Eclipse | Disapp. W. | 4 | 16 | 11 | 50.6 | I. | Shadow | Egress | 9 | 4 | 42 | |
| III. | Eclipse | Disapp. | 4 | 17 | 50 | 15.4 | I. | Transit | Egress | 9 | 5 | 8 | |
| I. | Occult. | Reapp. | 4 | 18 | 58 | | I. | Eclipse | Disapp. | 9 | 23 | 37 | 52.0 |
| III. | Occult. | Reapp. W. | 4 | 22 | 51 | | I. | Occult. | Reapp. | 10 | 2 | 16 | |
| II. | Eclipse | Disapp. | 5 | 7 | 4 | 8.3 | II. | Shadow | Ingress W. | 10 | 14 | 36 | |
| II. | Occult. | Reapp. W. | 5 | 10 | 51 | | II. | Transit | Ingress W. | 10 | 15 | 27 | |

## WASHINGTON MEAN TIME.

### SEPTEMBER.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II. | Shadow | Egress | 10 | 17 | 24 | | I. | Transit | Egress | 18 | 1 | 18 | |
| II. | Transit | Egress | 10 | 18 | 10 | | I. | Eclipse | Disapp. | 18 | 20 | 1 | 31.6 |
| I. | Shadow | Ingress | 10 | 20 | 54 | | I. | Occult. | Reapp. | 18 | 22 | 26 | |
| I. | Transit | Ingress | 10 | 21 | 20 | | III. | Eclipse | Disapp. | 19 | 1 | 53 | 13.8 |
| I. | Shadow | Egress | 10 | 23 | 10 | | III. | Occult. | Reapp. | 19 | 5 | 28 | |
| I. | Transit | Egress | 10 | 23 | 34 | | II. | Eclipse | Disapp. W. | 19 | 12 | 15 | 3.9 |
| IV. | Eclipse | Disapp. W. | 11 | 12 | 53 | 9.6 | II. | Occult. | Reapp. W. | 19 | 15 | 19 | |
| IV. | Eclipse | Reapp. W. | 11 | 14 | 11 | 11.8 | I. | Shadow | Ingress | 19 | 17 | 18 | |
| I. | Eclipse | Disapp. | 11 | 18 | 6 | 36.6 | I. | Transit | Ingress | 19 | 17 | 30 | |
| I. | Occult. | Reapp. | 11 | 20 | 42 | | I. | Shadow | Egress | 19 | 19 | 34 | |
| III. | Eclipse | Disapp. | 11 | 21 | 51 | 42.1 | I. | Transit | Egress | 19 | 19 | 44 | |
| III. | Occult. | Reapp. | 12 | 2 | 12 | | IV. | Shadow | Ingress | 19 | 23 | 32 | |
| II. | Eclipse | Disapp. W. | 12 | 9 | 39 | 36.0 | IV. | Shadow | Egress | 20 | 1 | 15 | |
| II. | Occult. | Reapp. W. | 12 | 13 | 6 | | I. | Eclipse | Disapp. W. | 20 | 14 | 30 | 12.7 |
| I. | Shadow | Ingress W. | 12 | 15 | 23 | | I. | Occult. | Reapp. W. | 20 | 16 | 52 | |
| I. | Transit | Ingress W. | 12 | 15 | 46 | | II. | Shadow | Ingress | 21 | 6 | 33 | |
| I. | Shadow | Egress | 12 | 17 | 39 | | II. | Transit | Ingress | 21 | 6 | 51 | |
| I. | Transit | Egress | 12 | 18 | 0 | | II. | Shadow | Egress W. | 21 | 9 | 20 | |
| I. | Eclipse | Disapp. W. | 13 | 12 | 35 | 15.8 | II. | Transit | Egress W. | 21 | 9 | 34 | |
| I. | Occult. | Reapp. W. | 13 | 15 | 8 | | I. | Shadow | Ingress W. | 21 | 11 | 46 | |
| II. | Shadow | Ingress | 14 | 3 | 56 | | I. | Transit | Ingress W. | 21 | 11 | 56 | |
| II. | Transit | Ingress | 14 | 4 | 36 | | I. | Shadow | Egress W. | 21 | 14 | 2 | |
| II. | Shadow | Egress | 14 | 6 | 43 | | I. | Transit | Egress W. | 21 | 14 | 10 | |
| II. | Transit | Egress | 14 | 7 | 19 | | I. | Eclipse | Disapp. W. | 22 | 8 | 59 | 2.0 |
| I. | Shadow | Ingress W. | 14 | 9 | 52 | | I. | Occult. | Reapp. W. | 22 | 11 | 18 | |
| I. | Transit | Ingress W. | 14 | 10 | 12 | | III. | Shadow | Ingress W. | 22 | 16 | 0 | |
| I. | Shadow | Egress W. | 14 | 12 | 8 | | III. | Transit | Ingress W. | 22 | 16 | 32 | |
| I. | Transit | Egress W. | 14 | 12 | 26 | | III. | Shadow | Egress | 22 | 19 | 3 | |
| I. | Eclipse | Disapp. | 15 | 7 | 4 | 1.8 | III. | Transit | Egress | 22 | 19 | 19 | |
| I. | Occult. | Reapp. W. | 15 | 9 | 34 | | II. | Eclipse | Disapp. | 23 | 1 | 32 | 47.9 |
| III. | Shadow | Ingress W. | 15 | 11 | 58 | | II. | Occult. | Reapp. | 23 | 4 | 26 | |
| III. | Transit | Ingress W. | 15 | 13 | 17 | | I. | Shadow | Ingress | 23 | 6 | 15 | |
| III. | Shadow | Egress W. | 15 | 15 | 2 | | I. | Transit | Ingress | 23 | 6 | 22 | |
| III. | Transit | Egress W. | 15 | 16 | 2 | | I. | Shadow | Egress W. | 23 | 8 | 31 | |
| II. | Eclipse | Disapp. | 15 | 22 | 57 | 20.5 | I. | Transit | Egress W. | 23 | 8 | 36 | |
| II. | Occult. | Reapp. | 16 | 2 | 12 | | I. | Eclipse | Disapp. | 24 | 3 | 27 | 45.9 |
| I. | Shadow | Ingress | 16 | 4 | 20 | | I. | Occult. | Reapp. | 24 | 5 | 44 | |
| I. | Transit | Ingress | 16 | 4 | 38 | | II. | Shadow | Ingress | 24 | 19 | 51 | |
| I. | Shadow | Egress | 16 | 6 | 36 | | II. | Transit | Ingress | 24 | 19 | 58 | |
| I. | Transit | Egress | 16 | 6 | 52 | | II. | Shadow | Egress | 24 | 22 | 38 | |
| I. | Eclipse | Disapp. | 17 | 1 | 32 | 44.5 | II. | Transit | Egress | 24 | 22 | 41 | |
| I. | Occult. | Reapp. | 17 | 4 | 0 | | I. | Shadow | Ingress | 25 | 0 | 44 | |
| II. | Shadow | Ingress | 17 | 17 | 14 | | I. | Transit | Ingress | 25 | 0 | 47 | |
| II. | Transit | Ingress | 17 | 17 | 43 | | I. | Shadow | Egress | 25 | 3 | 0 | |
| II. | Shadow | Egress | 17 | 20 | 1 | | I. | Transit | Egress | 25 | 3 | 1 | |
| II. | Transit | Egress | 17 | 20 | 26 | | I. | Eclipse | Disapp. | 25 | 21 | 56 | 35.4 |
| I. | Shadow | Ingress | 17 | 22 | 49 | | I. | Occult. | Reapp. | 26 | 0 | 10 | |
| I. | Transit | Ingress | 17 | 23 | 4 | | III. | Eclipse | Disapp. | 26 | 5 | 55 | 11.3 |
| I. | Shadow | Egress | 18 | 1 | 5 | | III. | Occult. | Reapp. W. | 26 | 8 | 45 | |

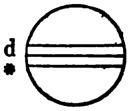
## WASHINGTON MEAN TIME.

### SEPTEMBER.

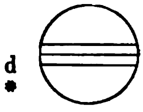
| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II. | Occult. | Disapp. W. | 26 | 14 | 49 | | I. | Shadow | Ingress W. | 28 | 13 | 41 | |
| II. | Occult. | Reapp. | 26 | 17 | 32 | | I. | Transit | Egress W. | 28 | 15 | 52 | |
| I. | Transit | Ingress | 26 | 19 | 12 | | I. | Shadow | Egress W. | 28 | 15 | 57 | |
| I. | Shadow | Ingress | 26 | 19 | 13 | | I. | Occult. | Disapp. W. | 29 | 10 | 48 | |
| I. | Transit | Egress | 26 | 21 | 26 | | I. | Eclipse | Reapp. W. | 29 | 13 | 5 | 32.6 |
| I. | Shadow | Egress | 26 | 21 | 29 | | III. | Transit | Ingress | 29 | 19 | 46 | |
| I. | Occult. | Disapp. W. | 27 | 16 | 22 | | III. | Shadow | Ingress | 29 | 20 | 2 | |
| I. | Eclipse | Reapp. | 27 | 18 | 36 | 42.0 | III. | Transit | Egress | 29 | 22 | 34 | |
| IV. | Eclipse | Disapp. W. | 28 | 7 | 25 | 35.3 | III. | Shadow | Egress | 29 | 23 | 4 | |
| IV. | Eclipse | Reapp. W. | 28 | 8 | 8 | 43.9 | II. | Occult. | Disapp. | 30 | 3 | 57 | |
| II. | Transit | Ingress W. | 28 | 9 | 7 | | II. | Eclipse | Reapp. W. | 30 | 6 | 48 | 59.6 |
| II. | Shadow | Ingress W. | 28 | 9 | 11 | | I. | Transit | Ingress W. | 30 | 8 | 4 | |
| II. | Transit | Egress W. | 28 | 11 | 50 | | I. | Shadow | Ingress W. | 30 | 8 | 10 | |
| II. | Shadow | Egress W. | 28 | 11 | 58 | | I. | Transit | Egress W. | 30 | 10 | 18 | |
| I. | Transit | Ingress W. | 28 | 13 | 38 | | I. | Shadow | Egress W. | 30 | 10 | 27 | |

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

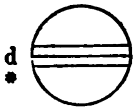
I.



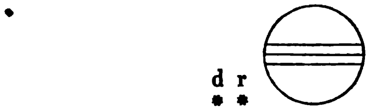
III.



II.



IV.



### OCTOBER.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Occult. | Disapp. | 1 | 5 | 14 | | III. | Eclipse | Reapp. W. | 3 | 12 | 46 | 19.9 |
| I. | Eclipse | Reapp. W. | 1 | 7 | 34 | 17.7 | II. | Occult. | Disapp. | 3 | 17 | 1 | |
| II. | Transit | Ingress | 1 | 22 | 14 | | II. | Eclipse | Reapp. | 3 | 20 | 6 | 35.7 |
| II. | Shadow | Ingress | 1 | 22 | 30 | | I. | Transit | Ingress | 3 | 20 | 56 | |
| II. | Transit | Egress | 2 | 0 | 57 | | I. | Shadow | Ingress | 3 | 21 | 7 | |
| II. | Shadow | Egress | 2 | 1 | 17 | | I. | Transit | Egress | 3 | 23 | 10 | |
| I. | Transit | Ingress | 2 | 2 | 30 | | I. | Shadow | Egress | 3 | 23 | 23 | |
| I. | Shadow | Ingress | 2 | 2 | 39 | | I. | Occult. | Disapp. | 4 | 18 | 6 | |
| I. | Transit | Egress | 2 | 4 | 44 | | I. | Eclipse | Reapp. | 4 | 20 | 31 | 52.8 |
| I. | Shadow | Egress | 2 | 4 | 55 | | II. | Transit | Ingress W. | 5 | 11 | 22 | |
| I. | Occult. | Disapp. | 2 | 23 | 40 | | II. | Shadow | Ingress W. | 5 | 11 | 49 | |
| I. | Eclipse | Reapp. | 3 | 2 | 3 | 8.6 | II. | Transit | Egress W. | 5 | 14 | 6 | |
| III. | Occult. | Disapp. W. | 3 | 9 | 12 | | II. | Shadow | Egress W. | 5 | 14 | 36 | |

## WASHINGTON MEAN TIME.

## OCTOBER.

| | | | d. | h | m. | s. |
|---|---|---|---|---|---|---|
| I. | Transit | Ingress W. | 5 | 15 | 22 | |
| I. | Shadow | Ingress W. | 5 | 15 | 36 | |
| I. | Transit | Egress | 5 | 17 | 37 | |
| I. | Shadow | Egress | 5 | 17 | 51 | |
| I. | Occult. | Disapp. W. | 6 | 12 | 32 | |
| I. | Eclipse | Reapp. W. | 6 | 15 | 0 | 45.4 |
| IV. | Shadow | Ingress | 6 | 17 | 59 | |
| IV. | Shadow | Egress | 6 | 19 | 16 | |
| III. | Transit | Ingress | 6 | 23 | 1 | |
| III. | Shadow | Ingress | 7 | 0 | 3 | |
| III. | Transit | Egress | 7 | 1 | 50 | |
| III. | Shadow | Egress | 7 | 3 | 4 | |
| II. | Occult. | Disapp. W. | 7 | 6 | 8 | |
| II. | Eclipse | Reapp. W. | 7 | 9 | 24 | 11.3 |
| I. | Transit | Ingress W. | 7 | 9 | 48 | |
| I. | Shadow | Ingress W. | 7 | 10 | 5 | |
| I. | Transit | Egress W. | 7 | 12 | 3 | |
| I. | Shadow | Egress W. | 7 | 12 | 21 | |
| I. | Occult. | Disapp. W. | 8 | 6 | 58 | |
| I. | Eclipse | Reapp. W. | 8 | 9 | 29 | 32.6 |
| II. | Transit | Ingress | 9 | 0 | 29 | |
| II. | Shadow | Ingress | 9 | 1 | 7 | |
| II. | Transit | Egress | 9 | 3 | 13 | |
| II. | Shadow | Egress | 9 | 3 | 54 | |
| I. | Transit | Ingress | 9 | 4 | 14 | |
| I. | Shadow | Ingress | 9 | 4 | 33 | |
| I. | Transit | Egress W. | 9 | 6 | 29 | |
| I. | Shadow | Egress W. | 9 | 6 | 49 | |
| I. | Occult. | Disapp. | 10 | 1 | 24 | |
| I. | Eclipse | Reapp. | 10 | 3 | 58 | 25.6 |
| III. | Occult. | Disapp. W. | 10 | 12 | 28 | |
| III. | Eclipse | Reapp. | 10 | 16 | 48 | 10.5 |
| II. | Occult. | Disapp. | 10 | 19 | 15 | |
| I. | Transit | Ingress | 10 | 22 | 40 | |
| II. | Eclipse | Reapp. | 10 | 22 | 41 | 49.2 |
| I. | Shadow | Ingress | 10 | 23 | 2 | |
| I. | Transit | Egress | 11 | 0 | 55 | |
| I. | Shadow | Egress | 11 | 1 | 18 | |
| I. | Occult. | Disapp. | 11 | 19 | 50 | |
| I. | Eclipse | Reapp. | 11 | 22 | 27 | 11.6 |
| II. | Transit | Ingress W. | 12 | 13 | 38 | |
| II. | Shadow | Ingress W. | 12 | 14 | 27 | |
| II. | Transit | Egress | 12 | 16 | 23 | |
| I. | Transit | Ingress | 12 | 17 | 6 | |
| II. | Shadow | Egress | 12 | 17 | 14 | |
| I. | Shadow | Ingress | 12 | 17 | 31 | |
| I. | Transit | Egress | 12 | 19 | 21 | |
| I. | Shadow | Egress | 12 | 19 | 47 | |
| I. | Occult. | Disapp. W. | 13 | 14 | 16 | |
| I. | Eclipse | Reapp. | 13 | 16 | 56 | 6.2 |
| III. | Transit | Ingress | 14 | 2 | 17 | |
| III. | Shadow | Ingress | 14 | 4 | 5 | |
| III. | Transit | Egress | 14 | 5 | 8 | |
| III. | Shadow | Egress W. | 14 | 7 | 5 | |
| II. | Occult. | Disapp. W. | 14 | 8 | 22 | |
| I. | Transit | Ingress W. | 14 | 11 | 32 | |
| I. | Shadow | Ingress W. | 14 | 11 | 59 | |
| II. | Eclipse | Reapp. W. | 14 | 11 | 59 | 26.9 |
| I. | Transit | Egress W. | 14 | 13 | 47 | |
| I. | Shadow | Egress W. | 14 | 14 | 15 | |
| I. | Occult. | Disapp. W. | 15 | 8 | 42 | |
| I. | Eclipse | Reapp. W. | 15 | 11 | 24 | 55.3 |
| II. | Transit | Ingress | 16 | 0 | 46 | |
| II. | Shadow | Ingress | 16 | 2 | 46 | |
| I. | Transit | Ingress | 16 | 5 | 58 | |
| II. | Transit | Egress W. | 16 | 5 | 31 | |
| I. | Shadow | Ingress W. | 16 | 6 | 28 | |
| II. | Shadow | Egress W. | 16 | 6 | 33 | |
| I. | Transit | Egress W. | 16 | 8 | 13 | |
| I. | Shadow | Egress W. | 16 | 8 | 44 | |
| I. | Occult. | Disapp. | 17 | 3 | 8 | |
| I. | Eclipse | Reapp. | 17 | 5 | 53 | 50.2 |
| III. | Occult. | Disapp. | 17 | 15 | 46 | |
| III. | Eclipse | Reapp. | 17 | 20 | 49 | 35.5 |
| II. | Occult. | Disapp. | 17 | 21 | 29 | |
| I. | Transit | Ingress | 18 | 0 | 24 | |
| I. | Shadow | Ingress | 18 | 0 | 57 | |
| II. | Eclipse | Reapp. | 18 | 1 | 17 | 7.1 |
| I. | Transit | Egress | 18 | 2 | 39 | |
| I. | Shadow | Egress | 18 | 3 | 12 | |
| I. | Occult. | Disapp. | 18 | 21 | 34 | |
| I. | Eclipse | Reapp. | 19 | 0 | 22 | 38.3 |
| II. | Transit | Ingress | 19 | 15 | 56 | |
| II. | Shadow | Ingress | 19 | 17 | 6 | |
| II. | Transit | Egress | 19 | 18 | 41 | |
| I. | Transit | Ingress | 19 | 18 | 50 | |
| I. | Shadow | Ingress | 19 | 19 | 26 | |
| II. | Shadow | Egress | 19 | 19 | 52 | |
| I. | Transit | Egress | 19 | 21 | 5 | |
| I. | Shadow | Egress | 19 | 21 | 42 | |
| I. | Occult. | Disapp. | 20 | 16 | 0 | |
| I. | Eclipse | Reapp. | 20 | 18 | 51 | 34.6 |
| III. | Transit | Ingress | 21 | 5 | 36 | |
| III. | Shadow | Ingress W. | 21 | 8 | 7 | |
| III. | Transit | Egress W. | 21 | 8 | 30 | |
| II. | Occult. | Disapp. W. | 21 | 10 | 37 | |
| III. | Shadow | Egress W. | 21 | 11 | 6 | |
| I. | Transit | Ingress W. | 21 | 13 | 16 | |

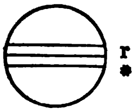
## WASHINGTON MEAN TIME.

## OCTOBER.

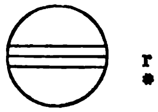
| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Shadow | Ingress W. | 21 | 13 | 55 | |
| II. | Eclipse | Reapp. W. | 21 | 14 | 34 | 46.9 |
| I. | Transit | Egress | 21 | 15 | 31 | |
| I. | Shadow | Egress | 21 | 16 | 10 | |
| I. | Occult. | Disapp. W. | 22 | 10 | 27 | |
| I. | Eclipse | Reapp. W. | 22 | 13 | 20 | 25.7 |
| II. | Transit | Ingress | 23 | 5 | 1 | |
| II. | Shadow | Ingress W. | 23 | 6 | 20 | |
| I. | Transit | Ingress W. | 23 | 7 | 42 | |
| II. | Transit | Egress W. | 23 | 7 | 46 | |
| I. | Shadow | Ingress W. | 23 | 8 | 23 | |
| II. | Shadow | Egress W | 23 | 9 | 7 | |
| I. | Transit | Egress W. | 23 | 9 | 57 | |
| I. | Shadow | Egress W. | 23 | 10 | 39 | |
| IV. | Shadow | Ingress W. | 23 | 12 | 31 | |
| IV. | Shadow | Egress W. | 23 | 13 | 16 | |
| I. | Occult. | Disapp. | 24 | 4 | 54 | |
| I. | Eclipse | Reapp. W. | 24 | 7 | 49 | 22.6 |
| III. | Occult. | Disapp. | 24 | 19 | 8 | |
| III. | Occult. | Reapp. | 24 | 22 | 3 | |
| III. | Eclipse | Disapp. | 24 | 22 | 5 | 31.9 |
| II. | Occult. | Disapp. | 24 | 23 | 45 | |
| III. | Eclipse | Reapp. | 25 | 0 | 51 | 14.3 |
| I. | Transit | Ingress | 25 | 2 | 9 | |
| I. | Shadow | Ingress | 25 | 2 | 52 | |
| II. | Eclipse | Reapp. | 25 | 3 | 52 | 29.5 |
| I. | Transit | Egress | 25 | 4 | 24 | |
| I. | Shadow | Egress | 25 | 5 | 7 | |
| I. | Occult. | Disapp. | 25 | 23 | 21 | |
| I. | Eclipse | Reapp. | 26 | 2 | 18 | 12.3 |
| II. | Transit | Ingress | 26 | 18 | 12 | |
| II. | Shadow | Ingress | 26 | 19 | 39 | |
| I. | Transit | Ingress | 26 | 20 | 36 | |
| II. | Transit | Egress | 26 | 20 | 57 | |
| I. | Shadow | Ingress | 26 | 21 | 21 | |
| II. | Shadow | Egress | 26 | 22 | 27 | |
| I. | Transit | Egress | 26 | 22 | 51 | |
| I. | Shadow | Egress | 26 | 23 | 36 | |
| I. | Occult. | Disapp. | 27 | 17 | 48 | |
| I. | Eclipse | Reapp. | 27 | 20 | 47 | 10.4 |
| III. | Transit | Ingress W. | 28 | 8 | 58 | |
| III. | Transit | Egress W. | 28 | 11 | 55 | |
| III. | Shadow | Ingress W. | 28 | 12 | 9 | |
| II. | Occult. | Disapp. W. | 28 | 12 | 54 | |
| I. | Transit | Ingress | 28 | 15 | 2 | |
| III. | Shadow | Egress | 28 | 15 | 7 | |
| I. | Shadow | Ingress | 28 | 15 | 50 | |
| II. | Eclipse | Reapp. | 28 | 17 | 10 | 12.0 |
| I. | Transit | Egress | 28 | 17 | 17 | |
| I. | Shadow | Egress | 28 | 18 | 6 | |
| I. | Occult. | Disapp. W. | 29 | 12 | 14 | |
| I. | Eclipse | Reapp. | 29 | 15 | 16 | 3.1 |
| II. | Transit | Ingress W. | 30 | 7 | 26 | |
| II. | Shadow | Ingress W. | 30 | 9 | 3 | |
| I. | Transit | Ingress W. | 30 | 9 | 28 | |
| II. | Transit | Egress W. | 30 | 10 | 11 | |
| I. | Shadow | Ingress W. | 30 | 10 | 19 | |
| I. | Transit | Egress W. | 30 | 11 | 43 | |
| II. | Shadow | Egress W. | 30 | 11 | 49 | |
| I. | Shadow | Egress W. | 30 | 12 | 34 | |
| I. | Occult. | Disapp. W. | 31 | 6 | 41 | |
| I. | Eclipse | Reapp. W. | 31 | 9 | 45 | 1.7 |
| III. | Occult. | Disapp. | 31 | 22 | 32 | |

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

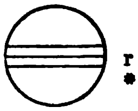
I.



III.



II.



IV. *Not Eclipsed.*

## WASHINGTON MEAN TIME.

## NOVEMBER.

|  |  |  | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| III. | Occult. | Reapp. | 1 | 1 | 30 |  |
| II. | Occult. | Disapp. | 1 | 2 | 4 |  |
| III. | Eclipse | Disapp. | 1 | 2 | 7 | 56.7 |
| I. | Transit | Ingress | 1 | 3 | 55 |  |
| I. | Shadow | Ingress | 1 | 4 | 48 |  |
| III. | Eclipse | Reapp. | 1 | 4 | 52 | 32.7 |
| I. | Transit | Egress W. | 1 | 6 | 10 |  |
| II. | Eclipse | Reapp. W. | 1 | 6 | 27 | 56.8 |
| I. | Shadow | Egress W. | 1 | 7 | 3 |  |
| I. | Occult. | Disapp. | 2 | 1 | 8 |  |
| I. | Eclipse | Reapp. | 2 | 4 | 13 | 52.7 |
| II. | Transit | Ingress | 2 | 20 | 37 |  |
| I. | Transit | Ingress | 2 | 22 | 22 |  |
| II. | Shadow | Ingress | 2 | 22 | 23 |  |
| I. | Shadow | Ingress | 2 | 23 | 16 |  |
| II. | Transit | Egress | 2 | 23 | 23 |  |
| I. | Transit | Egress | 3 | 0 | 37 |  |
| II. | Shadow | Egress | 3 | 1 | 9 |  |
| I. | Shadow | Egress | 3 | 1 | 31 |  |
| I. | Occult. | Disapp. | 3 | 19 | 35 |  |
| I. | Eclipse | Reapp. | 3 | 22 | 42 | 52.2 |
| III. | Transit | Ingress W. | 4 | 12 | 26 |  |
| II. | Occult. | Disapp. | 4 | 15 | 13 |  |
| III. | Transit | Egress | 4 | 15 | 24 |  |
| III. | Shadow | Ingress | 4 | 16 | 11 |  |
| I. | Transit | Ingress | 4 | 16 | 49 |  |
| I. | Shadow | Ingress | 4 | 17 | 45 |  |
| I. | Transit | Egress | 4 | 19 | 4 |  |
| III. | Shadow | Egress | 4 | 19 | 9 |  |
| II. | Eclipse | Reapp. | 4 | 19 | 45 | 42.4 |
| I. | Shadow | Egress | 4 | 20 | 0 |  |
| I. | Occult. | Disapp. W. | 5 | 14 | 2 |  |
| I. | Eclipse | Reapp. | 5 | 17 | 11 | 46.2 |
| II. | Transit | Ingress W. | 6 | 9 | 48 |  |
| I. | Transit | Ingress W. | 6 | 11 | 16 |  |
| II. | Shadow | Ingress W. | 6 | 11 | 42 |  |
| I. | Shadow | Ingress W. | 6 | 12 | 14 |  |
| II. | Transit | Egress W. | 6 | 12 | 34 |  |
| I. | Transit | Egress W. | 6 | 13 | 31 |  |
| II. | Shadow | Egress | 6 | 14 | 28 |  |
| I. | Shadow | Egress | 6 | 14 | 29 |  |
| I. | Occult. | Disapp. W. | 7 | 8 | 29 |  |
| I. | Eclipse | Reapp. W. | 7 | 11 | 40 | 46.2 |
| III. | Occult. | Disapp. | 8 | 2 | 2 |  |
| II. | Occult. | Disapp. | 8 | 4 | 24 |  |
| III. | Occult. | Reapp. | 8 | 5 | 1 |  |
| I. | Transit | Ingress W. | 8 | 5 | 43 |  |
| III. | Eclipse | Disapp. W. | 8 | 6 | 10 | 24.9 |
| I. | Shadow | Ingress W. | 8 | 6 | 43 |  |
| I. | Transit | Egress W. | 8 | 7 | 58 |  |
| III. | Eclipse | Reapp. W. | 8 | 8 | 53 | 54.3 |
| I. | Shadow | Egress W. | 8 | 8 | 58 |  |
| II. | Eclipse | Reapp. W. | 8 | 9 | 3 | 29.5 |
| IV. | Transit | Ingress | 8 | 21 | 14 |  |
| IV. | Transit | Egress | 8 | 22 | 10 |  |
| I. | Occult. | Disapp. | 9 | 2 | 56 |  |
| I. | Eclipse | Reapp. W. | 9 | 6 | 9 | 38.7 |
| II. | Transit | Ingress | 9 | 23 | 1 |  |
| I. | Transit | Ingress | 10 | 0 | 10 |  |
| II. | Shadow | Ingress | 10 | 1 | 2 |  |
| I. | Shadow | Ingress | 10 | 1 | 11 |  |
| II. | Transit | Egress | 10 | 1 | 47 |  |
| I. | Transit | Egress | 10 | 2 | 25 |  |
| I. | Shadow | Egress | 10 | 3 | 26 |  |
| II. | Shadow | Egress | 10 | 3 | 48 |  |
| I. | Occult. | Disapp. | 10 | 21 | 23 |  |
| I. | Eclipse | Reapp. | 11 | 0 | 38 | 39.3 |
| III. | Transit | Ingress | 11 | 15 | 57 |  |
| II. | Occult. | Disapp. | 11 | 17 | 35 |  |
| I. | Transit | Ingress | 11 | 18 | 37 |  |
| III. | Transit | Egress | 11 | 18 | 58 |  |
| I. | Shadow | Ingress | 11 | 19 | 40 |  |
| III. | Shadow | Ingress | 11 | 20 | 14 |  |
| I. | Transit | Egress | 11 | 20 | 52 |  |
| I. | Shadow | Egress | 11 | 21 | 55 |  |
| II. | Eclipse | Reapp. | 11 | 22 | 21 | 18.3 |
| III. | Shadow | Egress | 11 | 23 | 10 |  |
| I. | Occult. | Disapp. | 12 | 15 | 50 |  |
| I. | Eclipse | Reapp. | 12 | 19 | 7 | 34.5 |
| II. | Transit | Ingress W. | 13 | 12 | 13 |  |
| I. | Transit | Ingress W. | 13 | 13 | 4 |  |
| I. | Shadow | Ingress | 13 | 14 | 9 |  |
| II. | Shadow | Ingress | 13 | 14 | 21 |  |
| II. | Transit | Egress | 13 | 15 | 0 |  |
| I. | Transit | Egress | 13 | 15 | 19 |  |
| I. | Shadow | Egress | 13 | 16 | 24 |  |
| II. | Shadow | Egress | 13 | 17 | 6 |  |
| I. | Occult. | Disapp. W. | 14 | 10 | 17 |  |
| I. | Eclipse | Reapp. | 14 | 13 | 36 | 35.8 |
| III. | Occult. | Disapp. W. | 15 | 5 | 36 |  |
| II. | Occult. | Disapp. W. | 15 | 6 | 46 |  |
| I. | Transit | Ingress W. | 15 | 7 | 31 |  |
| I. | Shadow | Ingress W. | 15 | 8 | 37 |  |
| III. | Occult. | Reapp. W. | 15 | 8 | 37 |  |
| I. | Transit | Egress W. | 15 | 9 | 46 |  |
| III. | Eclipse | Disapp. W. | 15 | 10 | 13 | 17.0 |
| I. | Shadow | Egress W. | 15 | 10 | 52 |  |
| II. | Eclipse | Reapp. W. | 15 | 11 | 39 | 8.2 |

## WASHINGTON MEAN TIME.

### NOVEMBER.

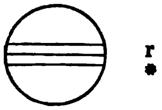
| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| III. | Eclipse | Reapp. W. | 15 | 12 | 55 | 39.4 |
| I. | Occult. | Disapp. | 16 | 4 | 45 | |
| I. | Eclipse | Reapp. W. | 16 | 8 | 5 | 29.2 |
| II. | Transit | Ingress | 17 | 1 | 27 | |
| I. | Transit | Ingress | 17 | 1 | 59 | |
| I. | Shadow | Ingress | 17 | 3 | 6 | |
| IV. | Occult. | Disapp. | 17 | 3 | 9 | |
| II. | Shadow | Ingress | 17 | 3 | 41 | |
| II. | Transit | Egress | 17 | 4 | 14 | |
| I. | Transit | Egress | 17 | 4 | 14 | |
| IV. | Occult. | Reapp. | 17 | 4 | 33 | |
| I. | Shadow | Egress | 17 | 5 | 21 | |
| II. | Shadow | Egress W. | 17 | 6 | 26 | |
| I. | Occult. | Disapp. | 17 | 23 | 12 | |
| I. | Eclipse | Reapp. | 18 | 2 | 34 | 30.8 |
| III. | Transit | Ingress | 18 | 19 | 34 | |
| II. | Occult. | Disapp. | 18 | 19 | 58 | |
| I. | Transit | Ingress | 18 | 20 | 26 | |
| I. | Shadow | Ingress | 18 | 21 | 35 | |
| III. | Transit | Egress | 18 | 22 | 36 | |
| I. | Transit | Egress | 18 | 22 | 41 | |
| I. | Shadow | Egress | 18 | 23 | 50 | |
| III. | Shadow | Ingress | 19 | 0 | 16 | |
| II. | Eclipse | Reapp. | 19 | 0 | 56 | 59.9 |
| III. | Shadow | Egress | 19 | 3 | 11 | |
| I. | Occult. | Disapp. | 19 | 17 | 40 | |
| I. | Eclipse | Reapp. | 19 | 21 | 3 | 24.0 |
| II. | Transit | Ingress | 20 | 14 | 40 | |
| I. | Transit | Ingress | 20 | 14 | 53 | |
| I. | Shadow | Ingress | 20 | 16 | 4 | |
| II. | Shadow | Ingress | 20 | 17 | 0 | |
| I. | Transit | Egress | 20 | 17 | 8 | |
| II. | Shadow | Egress | 20 | 17 | 28 | |
| I. | Transit | Egress | 20 | 18 | 19 | |
| II. | Shadow | Egress | 20 | 19 | 45 | |
| I. | Occult. | Disapp. W. | 21 | 12 | 8 | |
| I. | Eclipse | Reapp. | 21 | 15 | 32 | 29.1 |
| II. | Occult. | Disapp. W. | 22 | 9 | 11 | |
| III. | Occult. | Disapp. W. | 22 | 9 | 15 | |
| I. | Transit | Ingress W. | 22 | 9 | 20 | |
| I. | Shadow | Ingress W. | 22 | 10 | 33 | |
| I. | Transit | Egress W. | 22 | 11 | 36 | |
| III. | Occult. | Reapp. W. | 22 | 12 | 18 | |
| I. | Shadow | Egress W. | 22 | 12 | 48 | |
| II. | Eclipse | Reapp. | 22 | 14 | 14 | 52.4 |
| III. | Eclipse | Disapp. | 22 | 14 | 16 | 14.7 |
| III. | Eclipse | Reapp. | 22 | 16 | 57 | 29.9 |
| I. | Occult. | Disapp. W. | 23 | 6 | 36 | |
| I. | Eclipse | Reapp. W. | 23 | 10 | 1 | 23.6 |
| II. | Transit | Ingress | 24 | 3 | 55 | |
| I. | Transit | Ingress | 24 | 3 | 48 | |
| I. | Shadow | Ingress | 24 | 5 | 1 | |
| I. | Transit | Egress W. | 24 | 6 | 4 | |
| II. | Shadow | Ingress W. | 24 | 6 | 20 | |
| II. | Transit | Egress W. | 24 | 6 | 42 | |
| I. | Shadow | Egress W. | 24 | 7 | 16 | |
| II. | Shadow | Egress W. | 24 | 9 | 5 | |
| I. | Occult. | Disapp. | 25 | 1 | 4 | |
| I. | Eclipse | Reapp. | 25 | 4 | 30 | 25.9 |
| IV. | Transit | Ingress | 25 | 13 | 0 | |
| IV. | Transit | Egress | 25 | 14 | 44 | |
| I. | Transit | Ingress | 25 | 22 | 16 | |
| II. | Occult. | Disapp. | 25 | 22 | 23 | |
| III. | Transit | Ingress | 25 | 23 | 15 | |
| I. | Shadow | Ingress | 25 | 23 | 30 | |
| I. | Transit | Egress | 26 | 0 | 32 | |
| I. | Shadow | Egress | 26 | 1 | 45 | |
| III. | Transit | Egress | 26 | 2 | 18 | |
| II. | Eclipse | Reapp. | 26 | 3 | 32 | 47.6 |
| III. | Shadow | Ingress | 26 | 4 | 18 | |
| III. | Shadow | Egress W. | 26 | 7 | 12 | |
| I. | Occult. | Disapp. | 26 | 19 | 32 | |
| I. | Eclipse | Reapp. | 26 | 22 | 59 | 22.8 |
| I. | Transit | Ingress | 27 | 16 | 44 | |
| II. | Transit | Ingress | 27 | 17 | 10 | |
| I. | Shadow | Ingress | 27 | 17 | 59 | |
| I. | Transit | Egress | 27 | 19 | 0 | |
| II. | Shadow | Ingress | 27 | 19 | 39 | |
| II. | Transit | Egress | 27 | 19 | 57 | |
| I. | Shadow | Egress | 27 | 20 | 14 | |
| II. | Shadow | Egress | 27 | 22 | 24 | |
| I. | Occult. | Disapp. | 28 | 14 | 0 | |
| I. | Eclipse | Reapp. | 28 | 17 | 28 | 25.6 |
| I. | Transit | Ingress W. | 29 | 11 | 12 | |
| II. | Occult. | Disapp. W. | 29 | 11 | 38 | |
| I. | Shadow | Ingress W. | 29 | 12 | 27 | |
| III. | Occult. | Disapp. | 29 | 13 | 1 | |
| I. | Transit | Egress | 29 | 13 | 28 | |
| I. | Shadow | Egress | 29 | 14 | 42 | |
| III. | Occult. | Reapp. | 29 | 16 | 5 | |
| II. | Eclipse | Reapp. | 29 | 16 | 50 | 42.8 |
| III. | Eclipse | Disapp. | 29 | 18 | 19 | 52.9 |
| III. | Eclipse | Reapp. | 29 | 21 | 0 | 0.9 |
| I. | Occult. | Disapp. W. | 30 | 8 | 28 | |
| I. | Eclipse | Reapp. W. | 30 | 11 | 57 | 20.8 |

WASHINGTON MEAN TIME.

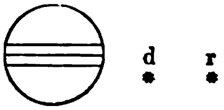
## NOVEMBER.

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

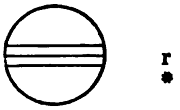
I.



III.



II.



IV. *Not Eclipsed.*

## DECEMBER.

| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Transit | Ingress W. | 1 | 5 | 40 | |
| II. | Transit | Ingress W. | 1 | 6 | 27 | |
| I. | Shadow | Ingress W. | 1 | 6 | 56 | |
| I. | Transit | Egress W. | 1 | 7 | 56 | |
| II. | Shadow | Ingress W. | 1 | 9 | 0 | |
| I. | Shadow | Egress W. | 1 | 9 | 11 | |
| II. | Transit | Egress W. | 1 | 9 | 14 | |
| II. | Shadow | Egress W. | 1 | 11 | 44 | |
| I. | Occult. | Disapp. | 2 | 2 | 56 | |
| I. | Eclipse | Reapp. W. | 2 | 6 | 26 | 23.1 |
| I. | Transit | Ingress | 3 | 0 | 8 | |
| II. | Occult. | Disapp. | 3 | 0 | 53 | |
| I. | Shadow | Ingress | 3 | 1 | 25 | |
| I. | Transit | Egress | 3 | 2 | 24 | |
| III. | Transit | Ingress | 3 | 3 | 2 | |
| I. | Shadow | Egress | 3 | 3 | 40 | |
| III. | Transit | Egress W. | 3 | 6 | 6 | |
| II. | Eclipse | Reapp. W. | 3 | 6 | 8 | 41.2 |
| III. | Shadow | Ingress W. | 3 | 8 | 21 | |
| III. | Shadow | Egress W. | 3 | 11 | 14 | |
| IV. | Occult. | Disapp. | 3 | 19 | 35 | |
| I. | Occult. | Disapp. | 3 | 21 | 24 | |
| IV. | Occult. | Reapp. | 3 | 21 | 30 | |
| I. | Eclipse | Reapp. | 4 | 0 | 55 | 20.6 |
| I. | Transit | Ingress | 4 | 18 | 36 | |
| II. | Transit | Ingress | 4 | 19 | 43 | |
| I. | Shadow | Ingress | 4 | 19 | 54 | |
| I. | Transit | Egress | 4 | 20 | 52 | |
| I. | Shadow | Egress | 4 | 22 | 9 | |
| II. | Shadow | Ingress | 4 | 22 | 18 | |
| II. | Transit | Egress | 4 | 22 | 30 | |
| II. | Shadow | Egress | 5 | 1 | 3 | |
| I. | Occult. | Disapp. | 5 | 15 | 52 | |
| I. | Eclipse | Reapp. | 5 | 19 | 24 | 23.7 |
| I. | Transit | Ingress | 6 | 13 | 4 | |
| II. | Occult. | Disapp. | 6 | 14 | 9 | |
| I. | Shadow | Ingress | 6 | 14 | 23 | |
| I. | Transit | Egress | 6 | 15 | 20 | |
| I. | Shadow | Egress | 6 | 16 | 38 | |
| III. | Occult. | Disapp. | 6 | 16 | 51 | |
| II. | Eclipse | Reapp. | 6 | 19 | 26 | 39.4 |
| III. | Occult. | Reapp. | 6 | 19 | 56 | |
| III. | Eclipse | Disapp. | 6 | 22 | 22 | 58.3 |
| III. | Eclipse | Reapp. | 7 | 1 | 1 | 58.9 |
| I. | Occult. | Disapp. W. | 7 | 10 | 21 | |
| I. | Eclipse | Reapp. | 7 | 13 | 53 | 19.3 |
| I. | Transit | Ingress W. | 8 | 7 | 33 | |
| I. | Shadow | Ingress W. | 8 | 8 | 52 | |
| II. | Transit | Ingress W. | 8 | 9 | 0 | |
| I. | Transit | Egress W. | 8 | 9 | 49 | |
| I. | Shadow | Egress W. | 8 | 11 | 7 | |
| II. | Shadow | Ingress W. | 8 | 11 | 39 | |
| II. | Transit | Egress W. | 8 | 11 | 48 | |
| II. | Shadow | Egress | 8 | 14 | 23 | |
| I. | Occult. | Disapp. | 9 | 4 | 49 | |
| I. | Eclipse | Reapp. W. | 9 | 8 | 21 | 21.9 |
| I. | Transit | Ingress | 10 | 2 | 1 | |
| I. | Shadow | Ingress | 10 | 3 | 21 | |
| II. | Occult. | Disapp. | 10 | 3 | 24 | |
| I. | Transit | Egress | 10 | 4 | 17 | |

## WASHINGTON MEAN TIME.

### DECEMBER.

| | | | d. | h. | m. | s. | | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I. | Shadow | Egress W. | 10 | 5 | 36 | | III. | Transit | Egress | 17 | 13 | 57 | |
| III. | Transit | Ingress W. | 10 | 6 | 54 | | III. | Shadow | Ingress | 17 | 16 | 26 | |
| II. | Eclipse | Reapp. W. | 10 | 8 | 44 | 40.8 | III. | Shadow | Egress | 17 | 19 | 17 | |
| III. | Transit | Egress W. | 10 | 9 | 59 | | I. | Occult. | Disapp. | 18 | 1 | 13 | |
| III. | Shadow | Ingress | 10 | 12 | 23 | | I. | Eclipse | Reapp. | 18 | 4 | 47 | 18.1 |
| III. | Shadow | Egress | 10 | 15 | 15 | | I. | Transit | Ingress | 18 | 22 | 24 | |
| I. | Occult. | Disapp. | 10 | 23 | 17 | | I. | Shadow | Ingress | 18 | 23 | 46 | |
| I. | Eclipse | Reapp. | 11 | 2 | 51 | 19.3 | I. | Transit | Egress | 19 | 0 | 40 | |
| I. | Transit | Ingress | 11 | 20 | 29 | | II. | Transit | Ingress | 19 | 0 | 54 | |
| I. | Shadow | Ingress | 11 | 21 | 50 | | I. | Shadow | Egress | 19 | 2 | 1 | |
| II. | Transit | Ingress | 11 | 22 | 17 | | II. | Shadow | Ingress | 19 | 3 | 36 | |
| I. | Transit | Egress | 11 | 22 | 45 | | II. | Transit | Egress | 19 | 3 | 42 | |
| I. | Shadow | Egress | 12 | 0 | 5 | | II. | Shadow | Egress W. | 19 | 6 | 21 | |
| II. | Shadow | Ingress | 12 | 0 | 57 | | I. | Occult. | Disapp. | 19 | 19 | 42 | |
| II. | Transit | Egress | 12 | 1 | 5 | | I. | Eclipse | Reapp. | 19 | 23 | 16 | 21.4 |
| II. | Shadow | Egress | 12 | 3 | 42 | | IV. | Occult. | Disapp. | 20 | 13 | 15 | |
| IV. | Transit | Ingress W. | 12 | 6 | 4 | | IV. | Occult. | Reapp. | 20 | 15 | 21 | |
| IV. | Transit | Egress W. | 12 | 8 | 5 | | I. | Transit | Ingress | 20 | 16 | 53 | |
| I. | Occult. | Disapp. | 12 | 17 | 46 | | I. | Shadow | Egress | 20 | 18 | 14 | |
| I. | Eclipse | Reapp. | 12 | 21 | 20 | 22.7 | I. | Transit | Egress | 20 | 19 | 9 | |
| I. | Transit | Ingress | 13 | 14 | 57 | | II. | Occult. | Disapp. | 20 | 19 | 16 | |
| I. | Shadow | Ingress | 13 | 16 | 19 | | I. | Shadow | Egress | 20 | 20 | 29 | |
| II. | Occult. | Disapp. | 13 | 16 | 41 | | II. | Eclipse | Reapp. | 21 | 0 | 38 | 50.8 |
| I. | Transit | Egress | 13 | 17 | 13 | | III. | Occult. | Disapp. | 21 | 0 | 45 | |
| I. | Shadow | Egress | 13 | 18 | 34 | | III. | Occult. | Reapp. | 21 | 3 | 52 | |
| III. | Occult. | Disapp. | 13 | 20 | 45 | | III. | Eclipse | Disapp. W. | 21 | 6 | 28 | 54.3 |
| II. | Eclipse | Reapp. | 13 | 22 | 2 | 42.1 | III. | Eclipse | Reapp. W. | 21 | 9 | 5 | 40.1 |
| III. | Occult. | Reapp. | 13 | 23 | 51 | | I. | Occult. | Disapp. | 21 | 14 | 11 | |
| III. | Eclipse | Disapp. | 14 | 2 | 26 | 9.2 | I. | Eclipse | Reapp. | 21 | 17 | 45 | 16.7 |
| III. | Eclipse | Reapp. | 14 | 5 | 4 | 2.4 | I. | Transit | Ingress | 22 | 11 | 22 | |
| I. | Occult. | Disapp. | 14 | 12 | 15 | | I. | Shadow | Ingress | 22 | 12 | 43 | |
| I. | Eclipse | Reapp. | 14 | 15 | 49 | 18.1 | I. | Transit | Egress | 22 | 13 | 38 | |
| I. | Transit | Ingress W. | 15 | 9 | 26 | | II. | Transit | Ingress | 22 | 14 | 14 | |
| I. | Shadow | Ingress W. | 15 | 10 | 48 | | I. | Shadow | Egress | 22 | 14 | 58 | |
| II. | Transit | Ingress W. | 15 | 11 | 36 | | II. | Shadow | Ingress | 22 | 16 | 56 | |
| I. | Transit | Egress W. | 15 | 11 | 42 | | II. | Transit | Egress | 22 | 17 | 2 | |
| I. | Shadow | Egress | 15 | 13 | 3 | | II. | Shadow | Egress | 22 | 19 | 40 | |
| II. | Shadow | Ingress | 15 | 14 | 18 | | I. | Occult. | Disapp. W. | 23 | 8 | 40 | |
| II. | Transit | Egress | 15 | 14 | 24 | | I. | Eclipse | Reapp. | 23 | 12 | 14 | 19.1 |
| II. | Shadow | Egress | 15 | 17 | 2 | | I. | Transit | Ingress W. | 24 | 5 | 51 | |
| I. | Occult. | Disapp. W. | 16 | 6 | 44 | | I. | Shadow | Ingress W. | 24 | 7 | 12 | |
| I. | Eclipse | Reapp. W. | 16 | 10 | 18 | 20.8 | I. | Transit | Egress W. | 24 | 8 | 7 | |
| I. | Transit | Ingress | 17 | 3 | 55 | | II. | Occult. | Disapp. W. | 24 | 8 | 34 | |
| I. | Shadow | Ingress | 17 | 5 | 17 | | I. | Shadow | Egress W. | 24 | 9 | 27 | |
| II. | Occult. | Disapp. W. | 17 | 5 | 58 | | II. | Eclipse | Reapp. | 24 | 13 | 56 | 58.2 |
| I. | Transit | Egress W. | 17 | 6 | 11 | | III. | Transit | Ingress | 24 | 14 | 54 | |
| I. | Shadow | Egress W. | 17 | 7 | 32 | | III. | Transit | Egress | 24 | 18 | 1 | |
| III. | Transit | Ingress W. | 17 | 10 | 50 | | III. | Shadow | Ingress | 24 | 20 | 29 | |
| II. | Eclipse | Reapp. W. | 17 | 11 | 20 | 46.4 | III. | Shadow | Egress | 24 | 23 | 19 | |

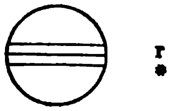
## WASHINGTON MEAN TIME.

## DECEMBER.

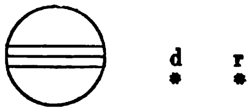
| | | | d. | h. | m. | s. |
|---|---|---|---|---|---|---|
| I. | Occult. | Disapp. | 25 | 3 | 9 | |
| I. | Eclipse | Reapp. W. | 25 | 6 | 43 | 16.0 |
| I. | Transit | Ingress | 26 | 0 | 20 | |
| I. | Shadow | Ingress | 26 | 1 | 41 | |
| I. | Transit | Egress | 26 | 2 | 36 | |
| II. | Transit | Ingress | 26 | 3 | 33 | |
| I. | Shadow | Egress | 26 | 3 | 56 | |
| II. | Shadow | Ingress W. | 26 | 6 | 15 | |
| II. | Transit | Egress W. | 26 | 6 | 21 | |
| II. | Shadow | Egress W. | 26 | 8 | 59 | |
| I. | Occult. | Disapp. | 26 | 21 | 38 | |
| I. | Eclipse | Reapp. | 27 | 1 | 12 | 18.9 |
| I. | Transit | Ingress | 27 | 18 | 49 | |
| I. | Shadow | Ingress | 27 | 20 | 10 | |
| I. | Transit | Egress | 27 | 21 | 5 | |
| II. | Occult. | Disapp. | 27 | 21 | 53 | |
| I. | Shadow | Egress | 27 | 22 | 25 | |
| II. | Eclipse | Reapp. | 28 | 3 | 15 | 6.1 |
| III. | Occult. | Disapp. | 28 | 4 | 49 | |
| III. | Occult. | Reapp. W. | 28 | 7 | 56 | |
| III. | Eclipse | Disapp. W. | 28 | 10 | 31 | 36.9 |
| III. | Eclipse | Reapp. | 28 | 13 | 7 | 15.3 |
| I. | Occult. | Disapp. | 28 | 16 | 7 | |
| I. | Eclipse | Reapp. | 28 | 19 | 41 | 13.9 |
| IV. | Transit | Ingress | 29 | 0 | 12 | |
| IV. | Transit | Egress | 29 | 2 | 21 | |
| I. | Transit | Ingress | 29 | 13 | 18 | |
| I. | Shadow | Ingress | 29 | 14 | 39 | |
| I. | Transit | Egress | 29 | 15 | 34 | |
| II. | Transit | Ingress | 29 | 16 | 54 | |
| I. | Shadow | Egress | 29 | 16 | 54 | |
| II. | Shadow | Ingress | 29 | 19 | 35 | |
| II. | Transit | Egress | 29 | 19 | 42 | |
| II. | Shadow | Egress | 29 | 22 | 19 | |
| I. | Occult. | Disapp. W. | 30 | 10 | 36 | |
| I. | Eclipse | Reapp. | 30 | 14 | 10 | 15.3 |
| I. | Transit | Ingress W. | 31 | 7 | 47 | |
| I. | Shadow | Ingress W. | 31 | 9 | 7 | |
| I. | Transit | Egress W. | 31 | 10 | 3 | |
| II. | Occult. | Disapp. | 31 | 11 | 12 | |
| I. | Shadow | Egress | 31 | 11 | 22 | |
| II. | Eclipse | Reapp. | 31 | 16 | 33 | 16.1 |
| III. | Transit | Ingress | 31 | 18 | 59 | |
| III. | Transit | Egress | 31 | 22 | 6 | |

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

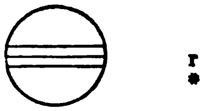
I.



III.



II.



IV. *Not Eclipsed.*

## WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

### SATELLITE I.

| | | h. | m. | | | h. | m. | | | h. | m. | | | h. | m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 2 | 16 | 6.7 | May | 18 | 0 | 59.4 | Aug. | 2 | 3 | 25.5 | Oct. | 17 | 4 | 16.1 |
| | 4 | 10 | 36.9 | | 19 | 19 | 29.0 | | 3 | 21 | 52.6 | | 18 | 22 | 42.5 |
| | 6 | 5 | 7.1 | | 21 | 13 | 58.6 | | 5 | 16 | 19.7 | | 20 | 17 | 8.9 |
| | 7 | 23 | 37.3 | | 23 | 8 | 28.1 | | 7 | 10 | 46.7 | | 22 | 11 | 35.4 |
| | 9 | 18 | 7.6 | | 25 | 2 | 57.6 | | 9 | 5 | 13.7 | | 24 | 6 | 1.9 |
| | 11 | 12 | 37.9 | | 26 | 21 | 27.0 | | 10 | 23 | 40.6 | | 26 | 0 | 28.4 |
| | 13 | 7 | 8.2 | | 28 | 15 | 56.4 | | 12 | 18 | 7.4 | | 27 | 18 | 55.1 |
| | 15 | 1 | 38.5 | | 30 | 10 | 25.7 | | 14 | 12 | 34.1 | | 29 | 13 | 21.8 |
| | 16 | 20 | 8.9 | June | 1 | 4 | 55.0 | | 16 | 7 | 0.8 | | 31 | 7 | 48.6 |
| | 18 | 14 | 39.3 | | 2 | 23 | 24.3 | | 18 | 1 | 27.4 | Nov. | 2 | 2 | 15.5 |
| | 20 | 9 | 9.7 | | 4 | 17 | 53.5 | | 19 | 19 | 54.0 | | 3 | 20 | 42.4 |
| | 22 | 3 | 40.1 | | 6 | 12 | 22.7 | | 21 | 14 | 20.5 | | 5 | 15 | 9.4 |
| | 23 | 22 | 10.5 | | 8 | 6 | 51.8 | | 23 | 8 | 47.0 | | 7 | 9 | 36.5 |
| | 25 | 16 | 41.0 | | 10 | 1 | 20.8 | | 25 | 3 | 13.4 | | 9 | 4 | 3.7 |
| | 27 | 11 | 11.5 | | 11 | 19 | 49.8 | | 26 | 21 | 39.7 | | 10 | 22 | 31.0 |
| | 29 | 5 | 42.0 | | 13 | 14 | 18.7 | | 28 | 16 | 6.0 | | 12 | 16 | 58.3 |
| | 31 | 0 | 12.5 | | 15 | 8 | 47.6 | | 30 | 10 | 32.3 | | 14 | 11 | 25.7 |
| April | 1 | 23 | 58.9 | | 17 | 3 | 16.5 | Sept. | 1 | 4 | 58.6 | | 16 | 5 | 53.1 |
| | 3 | 18 | 29.4 | | 18 | 21 | 45.3 | | 2 | 23 | 24.8 | | 18 | 0 | 20.7 |
| | 5 | 12 | 59.8 | | 20 | 16 | 14.0 | | 4 | 17 | 51.0 | | 19 | 18 | 48.3 |
| | 7 | 7 | 30.1 | | 22 | 10 | 42.7 | | 6 | 12 | 17.1 | | 21 | 13 | 16.0 |
| | 9 | 2 | 0.4 | | 24 | 5 | 11.3 | | 8 | 6 | 43.2 | | 23 | 7 | 43.8 |
| | 10 | 20 | 30.7 | | 25 | 23 | 39.9 | | 10 | 1 | 9.2 | | 25 | 2 | 11.7 |
| | 12 | 15 | 1.0 | | 27 | 18 | 8.4 | | 11 | 19 | 35.3 | | 26 | 20 | 39.6 |
| | 14 | 9 | 31.2 | | 29 | 12 | 36.9 | | 13 | 14 | 1.3 | | 28 | 15 | 7.7 |
| | 16 | 4 | 1.4 | July | 1 | 7 | 5.3 | | 15 | 8 | 27.3 | | 30 | 9 | 35.8 |
| | 17 | 22 | 31.5 | | 3 | 1 | 33.7 | | 17 | 2 | 53.2 | Dec. | 2 | 4 | 4.0 |
| | 19 | 17 | 1.6 | | 4 | 20 | 2.0 | | 18 | 21 | 19.2 | | 3 | 22 | 32.3 |
| | 21 | 11 | 31.7 | | 6 | 14 | 30.2 | | 20 | 15 | 45.2 | | 5 | 17 | 0.6 |
| | 23 | 6 | 1.8 | | 8 | 8 | 58.4 | | 22 | 10 | 11.2 | | 7 | 11 | 29.0 |
| | 25 | 0 | 31.8 | | 10 | 3 | 26.5 | | 24 | 4 | 37.1 | | 9 | 5 | 57.5 |
| | 26 | 19 | 1.8 | | 11 | 21 | 54.5 | | 25 | 23 | 3.0 | | 11 | 0 | 26.0 |
| | 28 | 13 | 31.8 | | 13 | 16 | 22.4 | | 27 | 17 | 28.8 | | 12 | 18 | 54.6 |
| | 30 | 8 | 1.7 | | 15 | 10 | 50.3 | | 29 | 11 | 54.7 | | 14 | 13 | 23.3 |
| May | 2 | 2 | 31.6 | | 17 | 5 | 18.1 | Oct. | 1 | 6 | 20.7 | | 16 | 7 | 52.1 |
| | 3 | 21 | 1.5 | | 18 | 23 | 45.8 | | 3 | 0 | 46.7 | | 18 | 2 | 21.0 |
| | 5 | 15 | 31.3 | | 20 | 18 | 13.5 | | 4 | 19 | 12.7 | | 19 | 20 | 49.9 |
| | 7 | 10 | 1.1 | | 22 | 12 | 41.1 | | 6 | 13 | 38.8 | | 21 | 15 | 18.9 |
| | 9 | 4 | 30.9 | | 24 | 7 | 8.7 | | 8 | 8 | 4.9 | | 23 | 9 | 47.9 |
| | 10 | 23 | 0.7 | | 26 | 1 | 36.2 | | 10 | 2 | 31.1 | | 25 | 4 | 17.0 |
| | 12 | 17 | 30.4 | | 27 | 20 | 3.6 | | 11 | 20 | 57.3 | | 26 | 22 | 46.2 |
| | 14 | 12 | 0.1 | | 29 | 14 | 31.0 | | 13 | 15 | 23.5 | | 28 | 17 | 15.5 |
| | 16 | 6 | 29.8 | | 31 | 8 | 58.3 | | 15 | 9 | 49.8 | | 30 | 11 | 44.9 |

### SATELLITE II.

| | | h. | m. | | | h. | m. | | | h. | m. | | | h | m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 4 | 0 | 9.4 | Jan. | 21 | 19 | 13.6 | April | 5 | 13 | 29.5 | April | 23 | 8 | 37.5 |
| | 7 | 13 | 33.3 | | 25 | 8 | 39.6 | | 9 | 2 | 55.1 | | 26 | 22 | 3.2 |
| | 11 | 2 | 58.4 | | 28 | 22 | 4.9 | | 12 | 16 | 21.5 | | 30 | 11 | 27.5 |
| | 14 | 16 | 22.9 | | 32 | 11 | 31.4 | | 16 | 5 | 46.7 | May | 4 | 0 | 52.7 |
| | 18 | 5 | 48.3 | April | 2 | 0 | 2.7 | | 19 | 19 | 12.8 | | 7 | 14 | 16.4 |

## WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

### SATELLITE II.

| | | h. m | | | h. m. | | | h. m. | | | h. m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| May | 11 | 3 41.0 | July | 10 | 14 26.9 | Sept. | 8 | 22 36.2 | Nov. | 8 | 5 46.6 |
| | 14 | 17 4.3 | | 14 | 3 43.0 | | 12 | 11 43.8 | | 11 | 18 57.7 |
| | 18 | 6 28.0 | | 17 | 16 57.7 | | 16 | 0 50.5 | | 15 | 8 9.2 |
| | 21 | 19 50.5 | | 21 | 6 12.6 | | 19 | 13 57.2 | | 18 | 21 21.5 |
| | 25 | 9 13.7 | | 24 | 19 26.5 | | 23 | 3 3.6 | | 22 | 10 34.4 |
| | 28 | 22 35.6 | | 28 | 8 40.0 | | 26 | 16 10.1 | | 25 | 23 46.7 |
| June | 1 | 11 58.0 | | 31 | 21 52.7 | | 30 | 5 18.2 | | 29 | 13 2 0 |
| | 5 | 1 19.0 | Aug. | 4 | 11 4.9 | Oct. | 3 | 18 23.0 | Dec. | 3 | 2 16.8 |
| | 8 | 14 40.3 | | 8 | 0 16.3 | | 7 | 7 30.0 | | 6 | 15 32.3 |
| | 12 | 4 0.7 | | 11 | 13 27.3 | | 10 | 20 36.6 | | 10 | 4 48.1 |
| | 15 | 17 21.0 | | 15 | 2 37.7 | | 14 | 9 44.1 | | 13 | 18 4.6 |
| | 19 | 6 40.2 | | 18 | 15 47.6 | | 17 | 22 51.6 | | 17 | 7 21.8 |
| | 22 | 19 59.5 | | 22 | 4 56.9 | | 21 | 11 59.6 | | 20 | 20 39 7 |
| | 26 | 9 17.9 | | 25 | 18 6.7 | | 25 | 1 7.7 | | 24 | 9 58.0 |
| | 29 | 22 36.4 | | 29 | 7 12.9 | | 28 | 14 16.8 | | 27 | 23 17.1 |
| July | 3 | 11 53.5 | Sept. | 1 | 20 22.0 | Nov. | 1 | 3 26.4 | | 31 | 12 36.2 |
| | 7 | 1 10.7 | | 5 | 9 29.6 | | 4 | 16 36.1 | | | |

### SATELLITE III.

| | | h. m. | | | h. m. | | | h. m. | | | h. m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 4 | 22 53.5 | May | 20 | 11 54.2 | Aug. | 7 | 7 43.5 | Oct. | 24 | 20 35.4 |
| | 12 | 3 18.4 | | 27 | 16 11.6 | | 14 | 11 16.6 | Nov. | 1 | 0 1.0 |
| | 19 | 7 45.3 | June | 3 | 20 25.5 | | 21 | 14 45.7 | | 8 | 3 31.3 |
| | 26 | 12 14.0 | | 11 | 0 36.4 | | 28 | 18 10.3 | | 15 | 7 6.3 |
| | 33 | 16 44.2 | | 18 | 4 41.1 | Sept. | 4 | 21 31.3 | | 22 | 10 46.7 |
| April | 7 | 9 26.9 | | 25 | 8 48.2 | | 12 | 0 49.3 | | 29 | 14 32.7 |
| | 14 | 13 55.2 | July | 2 | 12 49.0 | | 19 | 4 5.5 | Dec. | 6 | 18 23.5 |
| | 21 | 18 22.2 | | 9 | 16 45.2 | | 26 | 7 20.8 | | 13 | 22 18.2 |
| | 28 | 22 48.0 | | 16 | 20 37.2 | Oct. | 3 | 10 36.3 | | 21 | 2 18.7 |
| May | 6 | 3 11.9 | | 24 | 0 24.1 | | 10 | 13 53.8 | | 28 | 6 22.9 |
| | 13 | 7 34.4 | | 31 | 4 6.1 | | 17 | 17 13.0 | | | |

### SATELLITE IV.

| | | h. m. | | | h. m. | | | h. m. | | | h m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 3 | 18 50.3 | May | 17 | 16 53.4 | Aug. | 9 | 11 22.2 | Oct. | 31 | 12 12.7 |
| | 20 | 15 19.5 | June | 3 | 12 33.8 | | 26 | 2 40.8 | Nov. | 17 | 3 51.0 |
| March | 28 | 3 13.3 | | 20 | 7 35.2 | Sept. | 11 | 17 11.8 | Dec. | 3 | 20 32.6 |
| April | 14 | 0 5.8 | July | 7 | 1 48.0 | | 28 | 7 18.2 | | 20 | 14 17.7 |
| | 30 | 20 41.6 | | 23 | 19 5.1 | Oct. | 14 | 21 28.7 | | | |

Factors by which $x'$ and $y'$ in the following Table must be multiplied to obtain the coördinates $x$ and $y$ for any time.

$p$ = the inclination of the northern Semiminor Axis of the apparent ellipse to the circle of Declination ; + East, — W.

$x$ and $y$ at the time of the visible phase of every fourth eclipse for the $I^{st}$, of every second eclipse for the $II^{d}$, and of every eclipse for the $III^{d}$ and $IV^{th}$ Satellites.

## SATELLITE I.

| Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | | Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Factor for x'. | Factor for y'. | p. | x. | y. | | Factor for x'. | Factor for y'. | p. | x. | y. |
| | | | ° ′ | ″ | ″ | | | | ° ′ | ″ | ″ |
| Jan. 2 | 0.933 | +0.226 | −22 59.1 | +31 | +1 | Aug. 3 | 1.201 | +0.916 | −24 57.8 | −42 | +6 |
| 9 | 0.920 | 0.235 | 23 16.9 | 30 | 1 | 10 | 1.226 | 0.943 | 24 58.9 | 41 | 6 |
| 16 | 0.908 | 0.245 | 23 32.5 | 28 | 2 | 18 | 1.249 | 0.968 | 25 0.8 | 40 | 6 |
| 23 | 0.898 | 0.256 | 23 47.3 | 26 | 2 | 25 | 1.270 | 0.987 | 25 3.2 | 38 | 6 |
| 31 | 0.890 | 0.268 | 24 1.4 | +24 | 2 | Sept. 1 | 1.288 | 1.002 | 25 6.2 | 36 | 6 |
| March 29 | 0.880 | +0.404 | −25 18.8 | −22 | +3 | 8 | 1.301 | +1.010 | −25 9.3 | −33 | +6 |
| April 5 | 0.886 | 0.423 | 25 22.5 | 23 | 3 | 15 | 1.310 | 1.012 | 25 12.6 | 29 | 6 |
| 12 | 0.893 | 0.444 | 25 25.0 | 25 | 3 | 22 | 1.315 | 1.007 | 25 15.6 | −25 | 7 |
| 19 | 0.902 | 0.467 | 25 26.4 | 27 | 3 | 29 | 1.315 | 0.995 | 25 18.4 | +25 | 7 |
| 26 | 0.912 | 0.491 | 25 26.8 | 29 | 3 | Oct. 6 | 1.310 | 0.978 | 25 20.8 | 29 | 6 |
| May 3 | 0.924 | +0.516 | −25 26.2 | −31 | +3 | 13 | 1.299 | +0.954 | −25 22.7 | +32 | +6 |
| 10 | 0.938 | 0.541 | 25 24.6 | 32 | 3 | 20 | 1.285 | 0.928 | 25 24.1 | 35 | 6 |
| 18 | 0.953 | 0.568 | 25 22.6 | 34 | 3 | 27 | 1.267 | 0.898 | 25 25.1 | 38 | 6 |
| 25 | 0.970 | 0.597 | 25 20.0 | 36 | 4 | Nov. 3 | 1.246 | 0.867 | 25 25.8 | 40 | 5 |
| June 1 | 0.988 | 0.626 | 25 17.1 | 37 | 4 | 10 | 1.221 | 0.836 | 25 26.2 | 41 | 5 |
| 8 | 1.007 | +0.657 | −25 13.5 | −39 | +4 | 18 | 1.196 | +0.806 | −25 26.4 | +42 | +5 |
| 15 | 1.028 | 0.688 | 25 10.1 | 40 | 4 | 25 | 1.170 | 0.776 | 25 26.4 | 43 | 5 |
| 22 | 1.050 | 0.720 | 25 6.7 | 41 | 4 | Dec. 2 | 1.143 | 0.747 | 25 26.2 | 43 | 5 |
| 29 | 1.074 | 0.753 | 25 3.8 | 42 | 5 | 9 | 1.116 | 0.722 | 25 25 9 | 43 | 4 |
| July 6 | 1.099 | 0.787 | 25 1.2 | 43 | 5 | 16 | 1.090 | 0.700 | 25 25.4 | 42 | 4 |
| 13 | 1.124 | +0.820 | −24 59.3 | −44 | +5 | 23 | 1.065 | +0.681 | −25 24.5 | +41 | +4 |
| 20 | 1.150 | 0.853 | 24 58.0 | 44 | 5 | 30 | 1.041 | +0.664 | −25 23.3 | +40 | +4 |
| 27 | 1.176 | +0.885 | −24 57.5 | −43 | +5 | | | | | | |

## SATELLITE II.

| Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | | Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Factor for x'. | Factor for y'. | p. | x. | y. | | Factor for x'. | Factor for y'. | p. | x. | y. |
| | | | ° ′ | ″ | ″ | | | | ° ′ | ″ | ″ |
| Jan. 4 | 0.930 | +0.090 | −22 53.4 | +40 | +1 | July 31 | 1.191 | +0.643 | −25 8.5 | −58 | +7 |
| 11 | 0.917 | 0.098 | 23 9.7 | 38 | 1 | Aug. 8 | 1.216 | 0.665 | 25 9.3 | 56 | 8 |
| 18 | 0.906 | 0.107 | 23 25.7 | 35 | 1 | 15 | 1.240 | 0.685 | 25 10.9 | 53 | 8 |
| 25 | 0.896 | 0.117 | 23 41.3 | 32 | 1 | 22 | 1.262 | 0.701 | 25 12.9 | 50 | 8 |
| 32 | 0.888 | 0.128 | 23 56.3 | +29 | 1 | 29 | 1.281 | 0.713 | 25 15.5 | 46 | 8 |
| April 2 | 0.883 | +0.246 | −25 21.2 | −27 | +3 | Sept. 5 | 1.296 | +0.720 | −25 18.3 | −41 | +8 |
| 9 | 0.890 | 0.264 | 25 25.3 | 30 | 3 | 12 | 1.307 | 0.723 | 25 21.3 | 36 | 8 |
| 16 | 0.898 | 0.283 | 25 28.2 | 33 | 3 | 19 | 1.314 | 0.720 | 25 24.1 | 30 | 8 |
| 23 | 0.907 | 0.303 | 25 29.9 | 36 | 4 | 26 | 1.315 | 0.711 | 25 26.6 | −24 | 8 |
| 30 | 0.918 | 0.323 | 25 30.7 | 39 | 4 | Oct. 3 | 1.312 | 0.697 | 25 28.8 | +30 | 8 |
| May 7 | 0.931 | +0.344 | −25 30.4 | −42 | +4 | 10 | 1.303 | +0.679 | −25 30.5 | +36 | +8 |
| 14 | 0.946 | 0.365 | 25 29.5 | 45 | 4 | 17 | 1.291 | 0.658 | 25 31.9 | 41 | 8 |
| 21 | 0.962 | 0.388 | 25 27.8 | 47 | 4 | 25 | 1.274 | 0.634 | 25 32.9 | 46 | 7 |
| 28 | 0.979 | 0.411 | 25 25.6 | 50 | 5 | Nov. 1 | 1.254 | 0.610 | 25 33.5 | 49 | 7 |
| June 5 | 0.998 | 0.436 | 25 22.9 | 52 | 5 | 8 | 1.231 | 0.585 | 25 33.8 | 52 | 7 |
| 12 | 1.018 | +0.461 | −25 20.2 | −54 | +5 | 15 | 1.206 | +0.561 | −25 34.0 | +54 | +7 |
| 19 | 1.040 | 0.487 | 25 17.3 | 56 | 5 | 22 | 1.180 | 0.538 | 25 34.1 | 56 | 6 |
| 26 | 1.063 | 0.513 | 25 14.7 | 57 | 6 | 29 | 1.153 | 0.517 | 25 34.2 | 57 | 6 |
| July 3 | 1.088 | 0.540 | 25 12.4 | 58 | 6 | Dec. 6 | 1.126 | 0.498 | 25 34.3 | 57 | 6 |
| 10 | 1.113 | 0.567 | 25 10.5 | 59 | 7 | 13 | 1.100 | 0.482 | 25 34.1 | 56 | 6 |
| 17 | 1.139 | +0.593 | −25 9.1 | −59 | +7 | 20 | 1.075 | +0.469 | −25 33.7 | +55 | +6 |
| 24 | 1.165 | +0.619 | −25 8.4 | −59 | +7 | 27 | 1.050 | +0.458 | −25 33.1 | +54 | +5 |

## SATELLITE III.

| Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Disappearance. | | Reappearance. | |
| | Factor for $x'$. | Factor for $y'$. | $p$. | $x$. | $y$. | $x$. | $y$. |
| | | | ° ′ | ″ | ″ | ″ | ″ |
| Jan. 4 | 0.928 | +0.175 | +23 0.1 | +21 | + 3 | +53 | + 3 |
| 12 | 0.916 | 0.184 | 23 15.9 | +17 | 3 | 48 | 3 |
| 19 | 0.904 | 0.194 | 23 31.5 | . . | . . | 44 | 3 |
| 26 | 0.895 | 0.204 | 23 46.6 | . . | . . | 39 | 3 |
| 33 | 0.887 | 0.216 | 24 0.9 | . . | . . | +35 | 4 |
| April 7 | 0.888 | +0.362 | +25 20.8 | —35 | + 6 | . . | . . |
| 14 | 0.896 | 0.382 | 25 23.5 | 40 | 7 | . . | . . |
| 21 | 0.905 | 0.404 | 25 24.9 | 44 | 7 | —15 | + 7 |
| 28 | 0.916 | 0.427 | 25 25.2 | 49 | 7 | 19 | 7 |
| May 6 | 0.928 | 0.451 | 25 24.8 | 53 | 8 | 23 | 8 |
| 13 | 0.942 | +0.475 | +25 23.4 | —57 | + 8 | —27 | + 8 |
| 20 | 0.958 | 0.501 | 25 21.3 | 61 | 8 | 31 | 9 |
| 27 | 0.975 | 0.528 | 25 18.7 | 65 | 9 | 34 | 9 |
| June 3 | 0.994 | 0.556 | 25 15.7 | 69 | 9 | 37 | 10 |
| 11 | 1.015 | 0.585 | 25 12.5 | 72 | 10 | 40 | 10 |
| 18 | 1.037 | +0.615 | +25 9.3 | —74 | +10 | —42 | +11 |
| 25 | 1.061 | 0.646 | 25 6.2 | 76 | 11 | 44 | 11 |
| July 2 | 1.085 | 0.677 | 25 3.5 | 78 | 11 | 45 | 12 |
| 9 | 1.110 | 0.708 | 25 1.2 | 79 | 12 | 46 | 12 |
| 16 | 1.136 | 0.739 | 24 59.6 | 79 | 13 | 45 | 13 |
| 24 | 1.162 | +0.769 | +24 58.7 | —78 | +13 | —43 | +13 |
| 31 | 1.188 | 0.798 | 24 58.6 | 76 | 14 | 41 | 14 |
| Aug. 7 | 1.213 | 0.826 | 24 59.2 | 73 | 14 | 37 | 14 |
| 14 | 1.237 | 0.850 | 25 0.7 | 69 | 15 | 32 | 15 |
| 21 | 1.260 | 0.870 | 25 2.9 | 63 | 15 | 26 | 15 |
| 28 | 1.279 | +0.885 | +25 5.5 | —56 | +15 | —19 | +15 |
| Sept. 4 | 1.295 | 0.895 | 25 8.4 | 48 | 15 | . . | . . |
| 12 | 1.307 | 0.899 | 25 11.4 | 39 | 16 | . . | . . |
| 19 | 1.314 | 0.897 | 25 14.5 | 29 | 16 | . . | . . |
| 26 | 1.316 | 0.889 | 25 17.2 | —19 | 15 | +19 | 15 |
| Oct. 3 | 1.313 | +0.874 | +25 19.6 | . . | . . | +29 | +15 |
| 10 | 1.305 | 0.854 | 25 21.5 | . . | . . | 38 | 15 |
| 17 | 1.292 | 0.829 | 25 22.9 | . . | . . | 47 | 14 |
| 24 | 1.275 | 0.803 | 25 24.0 | +19 | +14 | 55 | 14 |
| Nov. 1 | 1.254 | 0.775 | 25 24.6 | 27 | 13 | 61 | 13 |
| 8 | 1.231 | +0.746 | +25 25.1 | +33 | +13 | +66 | +13 |
| 15 | 1.206 | 0.717 | 25 25.2 | 38 | 12 | 70 | 12 |
| 22 | 1.180 | 0.689 | 25 25.3 | 42 | 12 | 73 | 12 |
| 29 | 1.153 | 0.663 | 25 25.3 | 44 | 11 | 74 | 11 |
| Dec. 6 | 1.126 | 0.639 | 25 25.1 | 45 | 11 | 75 | 11 |
| 13 | 1.100 | +0.618 | +25 24.7 | +46 | +11 | +74 | +10 |
| 21 | 1.074 | 0.599 | 25 24.1 | 45 | 10 | 73 | 10 |
| 28 | 1.048 | +0.583 | +25 23.2 | +44 | +10 | +71 | +10 |

## SATELLITE IV.

| Date, 1856. | AT GEOCENTRIC SUPERIOR CONJUNCTION. | | | AT TIME OF ECLIPSE. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Disappearance. | | Reappearance. | |
| | Factor for $x'$. | Factor for $y'$. | $p$. | $x$. | $y$. | $x$. | $y$. |
| | | | ° ′ | ″ | ″ | ″ | ″ |
| Jan. 3 | 0.931 | +0.132 | +22 50.4 | + 52 | + 5 | + 81 | + 5 |
| 20 | 0.898 | 0.150 | 23 27.6 | + 35 | 5 | + 63 | 5 |
| March 28 | 0.879 | 0.267 | 25 10.1 | — 38 | 9 | — 14 | 9 |
| April 14 | 0.895 | 0.307 | 25 18.9 | 56 | 10 | 32 | 10 |
| 30 | 0.919 | 0.351 | 25 21.4 | 73 | 12 | 51 | 12 |
| May 17 | 0.952 | +0.400 | +25 18.7 | — 89 | +14 | — 67 | +14 |
| June 3 | 0.994 | 0.454 | 25 12.8 | 104 | 15 | 82 | 16 |
| 20 | 1.043 | 0.512 | 25 5.7 | 114 | 17 | 93 | 17 |
| July 7 | 1.101 | 0.574 | 24 59.5 | 120 | 19 | 100 | 19 |
| 23 | 1.161 | 0.635 | 24 56.3 | 117 | 22 | 97 | 22 |
| Aug. 9 | 1.221 | +0.690 | +24 57.2 | —104 | +24 | — 86 | +24 |
| 26 | 1.273 | 0.729 | 25 1.8 | 79 | 25 | 63 | 25 |
| Sept. 11 | 1.306 | 0.746 | 25 8.4 | — 43 | +26 | — 30 | +26 |
| 28 | 1.315 | 0.734 | 25 14.6 | .. | .. | .. | .. |
| Oct. 14 | 1.297 | 0.696 | 25 18.8 | .. | .. | .. | .. |
| 31 | 1.256 | +0.642 | +25 20.8 | .. | .. | .. | .. |
| Nov. 17 | 1.199 | 0.584 | 25 21.3 | .. | .. | .. | .. |
| Dec. 3 | 1.137 | 0.533 | 25 21.2 | .. | .. | .. | .. |
| 20 | 1.075 | +0.493 | +25 20.3 | .. | .. | .. | .. |

## SATELLITE I.

### COÖRDINATES IN THE MEAN APPARENT ELLIPSE, DESCRIBED BY THE SATELLITE, AND FOR THE MEAN DISTANCE OF JUPITER FROM THE SUN, FOR THE TIME ($t$) AFTER GEOCENTRIC SUPERIOR CONJUNCTION.

| $t$ | $x'$ | $y'$ | $t$ | $x'$ | $y'$ | $t$ | $x'$ | $y'$ |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | ″ | ″ | d. h. m. | ″ | ″ | d. h. m. | ″ | ″ |
| 0 0 0 | + 0.0 | + 6.6 | 0 5 20 | + 77.5 | + 4.7 | 0 10 40 | +109.1 | — 0.1 |
| 0 0 20 | 5.4 | 6.6 | 0 5 40 | 81.2 | 4.4 | 0 11 0 | 109.0 | 0.4 |
| 0 0 40 | 10.8 | 6.6 | 0 6 0 | 84.7 | 4.2 | 0 11 20 | 108.6 | 0.7 |
| 0 1 0 | 16.1 | 6.6 | 0 6 20 | 88.0 | 3.9 | 0 11 40 | 107.9 | 1.0 |
| 0 1 20 | 21.4 | 6.5 | 0 6 40 | 91.1 | 3.7 | 0 12 0 | 106.9 | 1.3 |
| 0 1 40 | + 26.6 | + 6.4 | 0 7 0 | + 94.0 | + 3.4 | 0 12 20 | +105.7 | — 1.7 |
| 0 2 0 | 31.8 | 6.3 | 0 7 20 | 96.6 | 3.1 | 0 12 40 | 104.2 | 2.0 |
| 0 2 20 | 36.9 | 6.2 | 0 7 40 | 99.0 | 2.8 | 0 13 0 | 102.5 | 2.3 |
| 0 2 40 | 42.0 | 6.1 | 0 8 0 | 101.1 | 2.5 | 0 13 20 | 100.5 | 2.6 |
| 0 3 0 | 46.9 | 6.0 | 0 8 20 | 103.0 | 2.2 | 0 13 40 | 98.3 | 2.9 |
| 0 3 20 | + 51.7 | + 5.8 | 0 8 40 | +104.7 | + 1.9 | 0 14 0 | + 95.8 | — 3.2 |
| 0 3 40 | 56.4 | 5.7 | 0 9 0 | 106.1 | 1.6 | 0 14 20 | 93.1 | 3.5 |
| 0 4 0 | 60.9 | 5.5 | 0 9 20 | 107.3 | 1.3 | 0 14 40 | 90.2 | 3.7 |
| 0 4 20 | 65.3 | 5.3 | 0 9 40 | 108.1 | 0.9 | 0 15 0 | 87.1 | 4.0 |
| 0 4 40 | 69.5 | 5.1 | 0 10 0 | 108.7 | 0.6 | 0 15 20 | 83.7 | 4.3 |
| 0 5 0 | + 73.6 | + 4.9 | 0 10 20 | +109.1 | + 0.3 | 0 15 40 | + 80.1 | — 4.5 |

## COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE I.

| t | x' | y' | t | x' | y' | t | x' | y' |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | " | " | d h. m. | " | " | d. h. m. | " | " |
| 0 16 0 | + 76.4 | — 4.7 | 1 1 40 | — 66.6 | — 5.2 | 1 11 0 | — 97.6 | + 3.0 |
| 0 16 20 | 72.5 | 5.0 | 1 2 0 | 70.8 | 5.0 | 1 11 20 | 95.1 | 3.3 |
| 0 16 40 | 68.4 | 5.2 | 1 2 20 | 74.8 | 4.8 | 1 11 40 | 92.3 | 3.5 |
| 0 17 0 | 64.1 | 5.4 | 1 2 40 | 78.6 | 4.6 | 1 12 0 | 89.3 | 3.8 |
| 0 17 20 | 59.6 | 5.5 | 1 3 0 | 82.2 | 4.4 | 1 12 20 | 86.1 | 4.1 |
| 0 17 40 | + 55.0 | — 5.7 | 1 3 20 | — 85.6 | — 4.1 | 1 12 40 | — 82.7 | + 4.3 |
| 0 18 0 | 50.3 | 5.9 | 1 3 40 | 88.9 | 3.8 | 1 13 0 | 79.1 | 4.6 |
| 0 18 20 | 45.5 | 6.0 | 1 4 0 | 91.9 | 3.6 | 1 13 20 | 75.3 | 4.8 |
| 0 18 40 | 40.5 | 6.1 | 1 4 20 | 94.7 | 3.3 | 1 13 40 | 71.3 | 5.0 |
| 0 19 0 | 35.5 | 6.3 | 1 4 40 | 97.3 | 3.0 | 1 14 0 | 67.1 | 5.2 |
| 0 19 20 | + 30.4 | — 6.4 | 1 5 0 | — 99.6 | — 2.7 | 1 14 20 | — 62.8 | + 5.4 |
| 0 19 40 | 25.2 | 6.4 | 1 5 20 | 101.7 | 2.4 | 1 14 40 | 58.3 | 5.6 |
| 0 20 0 | 19.9 | 6.5 | 1 5 40 | 103.5 | 2.1 | 1 15 0 | 53.7 | 5.8 |
| 0 20 20 | 14.6 | 6.6 | 1 6 0 | 105.1 | 1.8 | 1 15 20 | 49.0 | 5.9 |
| 0 20 40 | 9.2 | 6.6 | 1 6 20 | 106.4 | 1.5 | 1 15 40 | 44.1 | 6.1 |
| 0 21 0 | + 3.8 | — 6.6 | 1 6 40 | —107.5 | — 1.2 | 1 16 0 | — 39.1 | + 6.2 |
| 0 21 20 | — 1.5 | 6.6 | 1 7 0 | 108.3 | 0.8 | 1 16 20 | 34.0 | 6.3 |
| 0 21 40 | 6.9 | 6.6 | 1 7 20 | 108.8 | 0.5 | 1 16 40 | 28.9 | 6.4 |
| 0 22 0 | 12.3 | 6.6 | 1 7 40 | 109.1 | — 0.2 | 1 17 0 | 23.7 | 6.5 |
| 0 22 20 | 17.6 | 6.5 | 1 8 0 | 109.1 | + 0.1 | 1 17 20 | 18.4 | 6.5 |
| 0 22 40 | — 22.9 | — 6.5 | 1 8 20 | —108.9 | + 0.5 | 1 17 40 | — 13.0 | + 6.6 |
| 0 23 0 | 28.1 | 6.4 | 1 8 40 | 108.4 | 0.8 | 1 18 0 | 7.7 | 6.6 |
| 0 23 20 | 33.3 | 6.3 | 1 9 0 | 107.6 | 1.1 | 1 18 20 | — 2.3 | 6.6 |
| 0 23 40 | 38.4 | 6.2 | 1 9 20 | 106.6 | 1.4 | 1 18 40 | + 3.1 | 6.6 |
| 1 0 0 | 43.4 | 6.1 | 1 9 40 | 105.3 | 1.8 | 1 19 0 | 8.5 | 6.6 |
| 1 0 20 | — 48.3 | — 5.9 | 1 10 0 | —103.8 | + 2.1 | 1 19 20 | + 13.8 | + 6.6 |
| 1 0 40 | 53.1 | 5.8 | 1 10 20 | 102.0 | 2.4 | 1 19 40 | 19.1 | 6.5 |
| 1 1 0 | 57.7 | 5.6 | 1 10 40 | — 99.9 | + 2.7 | 1 20 0 | + 24.4 | + 6.5 |
| 1 1 20 | — 62.2 | — 5.4 | | | | | | |

## SATELLITE II.

| t | x' | y' | t | x' | y' | t | x' | y' |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | " | " | d. h. m. | " | " | d. h. m. | " | " |
| 0 0 0 | + 0.0 | +12.2 | 0 10 40 | +122.9 | + 8.6 | 0 21 20 | +173.8 | — 0.0 |
| 0 0 40 | 8.5 | 12.2 | 0 11 20 | 128.8 | 8.2 | 0 22 0 | 173.6 | 0.6 |
| 0 1 20 | 17.0 | 12.1 | 0 12 0 | 134.4 | 7.7 | 0 22 40 | 172.9 | 1.2 |
| 0 2 0 | 25.5 | 12.1 | 0 12 40 | 139.6 | 7.3 | 0 23 20 | 171.8 | 1.8 |
| 0 2 40 | 33.9 | 12.0 | 0 13 20 | 144.5 | 6.8 | 1 0 0 | 170.4 | 2.4 |
| 0 3 20 | + 42.2 | +11.8 | 0 14 0 | +149.0 | + 6.3 | 1 0 40 | +168.5 | — 3.0 |
| 0 4 0 | 50.5 | 11.7 | 0 14 40 | 153.2 | 5.7 | 1 1 20 | 166.2 | 3.5 |
| 0 4 40 | 58.6 | 11.5 | 0 15 20 | 157.0 | 5.2 | 1 2 0 | 163.5 | 4.1 |
| 0 5 20 | 66.5 | 11.3 | 0 16 0 | 160.5 | 4.7 | 1 2 40 | 160.4 | 4.7 |
| 0 6 0 | 74.3 | 11.0 | 0 16 40 | 163.6 | 4.1 | 1 3 20 | 157.0 | 5.2 |
| 0 6 40 | + 81.9 | +10.8 | 0 17 20 | +166.3 | + 3.5 | 1 4 0 | +153.2 | — 5.8 |
| 0 7 20 | 89.4 | 10.5 | 0 18 0 | 168.6 | 3.0 | 1 4 40 | 149.0 | 6.3 |
| 0 8 0 | 96.6 | 10.1 | 0 18 40 | 170.5 | 2.4 | 1 5 20 | 144.4 | 6.8 |
| 0 8 40 | 103.6 | 9.8 | 0 19 20 | 171.9 | 1.8 | 1 6 0 | 139.5 | 7.3 |
| 0 9 20 | 110.3 | 9.4 | 0 20 0 | 172.9 | 1.2 | 1 6 40 | 134.2 | 7.7 |
| 0 10 0 | +116.7 | + 9.0 | 0 20 40 | +173.6 | + 0.6 | 1 7 20 | +128.6 | — 8.2 |

## COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

### SATELLITE II.

| t | x′ | y′ | t | x′ | y′ | t | x′ | y′ |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | ″ | ″ | d h. m. | ″ | ″ | d. h. m. | ″ | ″ |
| 1 8 0 | +122.7 | — 8.6 | 2 3 20 | —103.7 | — 9.8 | 2 22 0 | —156.9 | + 5.2 |
| 1 8 40 | 116.5 | 9.0 | 2 4 0 | 110.4 | 9.4 | 2 22 40 | 153.0 | 5.8 |
| 1 9 20 | 110.1 | 9.4 | 2 4 40 | 116.8 | 9.0 | 2 23 20 | 148.8 | 6.3 |
| 1 10 0 | 103.4 | 9.8 | 2 5 20 | 123.0 | 8.6 | 3 0 0 | 144.2 | 6.8 |
| 1 10 40 | 96.4 | 10.1 | 2 6 0 | 128.9 | 8.2 | 3 0 40 | 139.8 | 7.3 |
| 1 11 20 | + 89.2 | —10.5 | 2 6 40 | —134.5 | — 7.7 | 3 1 20 | —134.1 | + 7.8 |
| 1 12 0 | 81.7 | 10.8 | 2 7 20 | 139.7 | 7.2 | 3 2 0 | 128.5 | 8.2 |
| 1 12 40 | 74.1 | 11.0 | 2 8 0 | 144.6 | 6.7 | 3 2 40 | 122.6 | 8.6 |
| 1 13 20 | 66.3 | 11.3 | 2 8 40 | 149.1 | 6.2 | 3 3 20 | 116.4 | 9.0 |
| 1 14 0 | 58.3 | 11.5 | 2 9 20 | 153.3 | 5.7 | 3 4 0 | 109.9 | 9.4 |
| 1 14 40 | + 50.2 | —11.7 | 2 10 0 | —157.1 | — 5.2 | 3 4 40 | —103.1 | + 9.8 |
| 1 15 20 | 42.0 | 11.8 | 2 10 40 | 160.6 | 4.6 | 3 5 20 | 96.1 | 10.1 |
| 1 16 0 | 33.7 | 12.0 | 2 11 20 | 163.7 | 4.1 | 3 6 0 | 88.9 | 10.5 |
| 1 16 40 | 25.3 | 12.1 | 2 12 0 | 166.4 | 3.5 | 3 6 40 | 81.5 | 10.8 |
| 1 17 20 | 16.8 | 12.1 | 2 12 40 | 168.6 | 2.9 | 3 7 20 | 73.9 | 11.0 |
| 1 18 0 | + 8.3 | —12.2 | 2 13 20 | —170.4 | — 2.3 | 3 8 0 | — 66.1 | +11.3 |
| 1 18 40 | — 0.2 | 12.2 | 2 14 0 | 171.9 | 1.8 | 3 8 40 | 58.1 | 11.5 |
| 1 19 20 | 8.8 | 12.2 | 2 14 40 | 173.0 | 1.2 | 3 9 20 | 50.0 | 11.7 |
| 1 20 0 | 17.3 | 12.1 | 2 15 20 | 173.6 | — 0.6 | 3 10 0 | 41.8 | 11.8 |
| 1 20 40 | 25.7 | 12.1 | 2 16 0 | 173.8 | + 0.0 | 3 10 40 | 33.5 | 12.0 |
| 1 21 20 | — 34.1 | —12.0 | 2 16 40 | —173.6 | + 0.6 | 3 11 20 | — 25.1 | +12.1 |
| 1 22 0 | 42.4 | 11.8 | 2 17 20 | 172.9 | 1.2 | 3 12 0 | 16.6 | 12.1 |
| 1 22 40 | 50.6 | 11.7 | 2 18 0 | 171.8 | 1.8 | 3 12 40 | — 8.1 | 12.2 |
| 1 23 20 | 58.7 | 11.5 | 2 18 40 | 170.3 | 2.4 | 3 13 20 | + 0.4 | 12.2 |
| 2 0 0 | 66.7 | 11.3 | 2 19 20 | 168.4 | 3.0 | 3 14 0 | 9.0 | 12.2 |
| 2 0 40 | — 74.5 | —11.0 | 2 20 0 | —166.2 | + 3.5 | 3 14 40 | + 17.5 | +12.1 |
| 2 1 20 | 82.1 | 10.7 | 2 20 40 | 163.5 | 4.1 | 3 15 20 | 26.0 | 12.1 |
| 2 2 0 | 89.5 | 10.4 | 2 21 20 | —160.4 | + 4.7 | 3 16 0 | + 34.4 | +12.0 |
| 2 2 40 | — 96.7 | —10.1 |  |  |  |  |  |  |

### SATELLITE III.

| t | x′ | y′ | t | x′ | y′ | t | x′ | y′ |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | ″ | ″ | d. h. m. | ″ | ″ | d. h. m. | ″ | ″ |
| 0 0 0 | + 0.0 | +17.4 | 0 21 20 | +194.7 | +12.4 | 1 18 40 | +277.2 | + 0.2 |
| 0 1 20 | 13.5 | 17.4 | 0 22 40 | 204.1 | 11.8 | 1 20 0 | 277.0 | — 0.6 |
| 0 2 40 | 26.9 | 17.3 | 1 0 0 | 213.0 | 11.1 | 1 21 20 | 276.2 | 1.5 |
| 0 4 0 | 40.3 | 17.2 | 1 1 20 | 221.4 | 10.5 | 1 22 40 | 274.7 | 2.3 |
| 0 5 20 | 53.6 | 17.1 | 1 2 40 | 229.3 | 9.8 | 2 0 0 | 272.6 | 3.2 |
| 0 6 40 | + 66.8 | +16.9 | 1 4 0 | +236.6 | + 9.1 | 2 1 20 | +269.8 | — 4.0 |
| 0 8 0 | 79.8 | 16.7 | 1 5 20 | 243.3 | 8.3 | 2 2 40 | 266.4 | 4.8 |
| 0 9 20 | 92.7 | 16.4 | 1 6 40 | 249.5 | 7.6 | 2 4 0 | 262.3 | 5.6 |
| 0 10 40 | 105.3 | 16.1 | 1 8 0 | 255.1 | 6.8 | 2 5 20 | 257.6 | 6.4 |
| 0 12 0 | 117.6 | 15.8 | 1 9 20 | 260.0 | 6.0 | 2 6 40 | 252.3 | 7.2 |
| 0 13 20 | +129.7 | +15.4 | 1 10 40 | +264.3 | + 5.2 | 2 8 0 | +246.4 | — 8.0 |
| 0 14 40 | 141.5 | 15.0 | 1 12 0 | 268.0 | 4.4 | 2 9 20 | 240.0 | 8.7 |
| 0 16 0 | 153.0 | 14.5 | 1 13 20 | 271.1 | 3.6 | 2 10 40 | 233.0 | 9.4 |
| 0 17 20 | 164.1 | 14.0 | 1 14 40 | 273.6 | 2.7 | 2 12 0 | 225.4 | 10.1 |
| 0 18 40 | 174.7 | 13.5 | 1 16 0 | 275.5 | 1.9 | 2 13 20 | 217.3 | 10.8 |
| 0 20 0 | +184.9 | +13.0 | 1 17 20 | +276.7 | + 1.1 | 2 14 40 | +208.6 | —11.5 |

## COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

### SATELLITE III.

| t | x′ | y′ | t | x′ | y′ | t | x′ | y′ |
|---|---|---|---|---|---|---|---|---|
| d. h. m. | " | " | d. h. m. | " | " | d. h. m. | " | " |
| 2 16 0 | +199.5 | —12.1 | 4 6 40 | —158.4 | —14.3 | 5 20 0 | —255.1 | + 6.8 |
| 2 17 20 | 189.9 | 12.7 | 4 8 0 | 169.3 | 13.8 | 5 21 20 | 249.5 | 7.6 |
| 2 18 40 | 179.9 | 13.3 | 4 9 20 | 179.8 | 13.3 | 5 22 40 | 243.3 | 8.3 |
| 2 20 0 | 169.4 | 13.8 | 4 10 40 | 189.9 | 12.7 | 6 0 0 | 236.6 | 9.1 |
| 2 21 20 | 158.5 | 14.3 | 4 12 0 | 199.5 | 12.1 | 6 1 20 | 229.3 | 9.8 |
| 2 22 40 | +147.2 | —14.8 | 4 13 20 | —208.6 | —11.5 | 6 2 40 | —221.4 | +10.5 |
| 3 0 0 | 135.6 | 15.2 | 4 14 40 | 217.3 | 10.8 | 6 4 0 | 213.0 | 11.1 |
| 3 1 20 | 123.7 | 15.6 | 4 16 0 | 225.5 | 10.1 | 6 5 20 | 204.1 | 11.8 |
| 3 2 40 | 111.5 | 16.0 | 4 17 20 | 233.1 | 9.4 | 6 6 40 | 194.7 | 12.4 |
| 3 4 0 | 99.0 | 16.3 | 4 18 40 | 240.1 | 8.7 | 6 8 0 | 184.9 | 13.0 |
| 3 5 20 | + 86.3 | —16.6 | 4 20 0 | —246.5 | — 8.0 | 6 9 20 | —174.7 | +13.5 |
| 3 6 40 | 73.3 | 16.8 | 4 21 20 | 252.3 | 7.2 | 6 10 40 | 164.1 | 14.0 |
| 3 8 0 | 60.2 | 17.0 | 4 22 40 | 257.6 | 6.4 | 6 12 0 | 153.0 | 14.5 |
| 3 9 20 | 47.0 | 17.2 | 5 0 0 | 262.3 | 5.6 | 6 13 20 | 141.5 | 15.0 |
| 3 10 40 | 33.6 | 17.3 | 5 1 20 | 266.4 | 4.8 | 6 14 40 | 129.7 | 15.4 |
| 3 12 0 | + 20.2 | —17.4 | 5 2 40 | —269.8 | — 4.0 | 6 16 0 | —117.6 | +15.8 |
| 3 13 20 | + 6.7 | 17.4 | 5 4 0 | 272.6 | 3.2 | 6 17 20 | 105.2 | 16.1 |
| 3 14 40 | — 6.8 | 17.4 | 5 5 20 | 274.7 | 2.3 | 6 18 40 | 92.6 | 16.4 |
| 3 16 0 | 20.3 | 17.4 | 5 6 40 | 276.2 | 1.5 | 6 20 0 | 79.8 | 16.7 |
| 3 17 20 | 33.7 | 17.3 | 5 8 0 | 277.0 | — 0.6 | 6 21 20 | 66.8 | 16.9 |
| 3 18 40 | — 47.1 | —17.2 | 5 9 20 | —277.2 | + 0.2 | 6 22 40 | — 53.6 | +17.1 |
| 3 20 0 | 60.3 | 17.0 | 5 10 40 | 276.7 | 1.1 | 7 0 0 | 40.3 | 17.2 |
| 3 21 20 | 73.4 | 16.8 | 5 12 0 | 275.5 | 1.9 | 7 1 20 | 26.9 | 17.3 |
| 3 22 40 | 86.3 | 16.6 | 5 13 20 | 273.7 | 2.7 | 7 2 40 | — 13.4 | 17.4 |
| 4 0 0 | 99.0 | 16.3 | 5 14 40 | 271.2 | 3.6 | 7 4 0 | + 0.1 | 17.4 |
| 4 1 20 | —111.5 | —16.0 | 5 16 0 | —268.1 | + 4.4 | 7 5 20 | + 13.6 | +17.4 |
| 4 2 40 | 123.7 | 15.6 | 5 17 20 | 264.4 | 5.2 | 7 6 40 | 27.0 | 17.3 |
| 4 4 0 | 135.7 | 15.2 | 5 18 40 | —260.1 | + 6.0 | 7 8 0 | + 40.4 | +17.2 |
| 4 5 20 | —147.2 | —14.8 |  |  |  |  |  |  |

### SATELLITE IV.

| t | x′ | y′ | t | x′ | y′ | t | x′ | y′ |
|---|---|---|---|---|---|---|---|---|
| d. h. | " | " | d. h. | " | " | d. h. | " | " |
| 0 0 | + 0.0 | +34.8 | 2 0 | +332.3 | +25.5 | 4 0 | +486.2 | + 2.5 |
| 0 3 | 22.8 | 34.8 | 2 3 | 348.6 | 24.3 | 4 3 | 487.3 | + 0.8 |
| 0 6 | 45.6 | 34.7 | 2 6 | 364.1 | 23.1 | 4 6 | 487.3 | — 0.8 |
| 0 9 | 68.3 | 34.5 | 2 9 | 378.9 | 21.9 | 4 9 | 486.3 | 2.4 |
| 0 12 | 90.9 | 34.2 | 2 12 | 392.9 | 20.6 | 4 12 | 484.2 | 4.1 |
| 0 15 | +113.2 | +33.9 | 2 15 | +406.0 | +19.3 | 4 15 | +480.9 | — 5.7 |
| 0 18 | 135.3 | 33.5 | 2 18 | 418.2 | 17.9 | 4 18 | 476.6 | 7.3 |
| 0 21 | 157.1 | 33.0 | 2 21 | 429.5 | 16.5 | 4 21 | 471.3 | 8.9 |
| 1 0 | 178.5 | 32.4 | 3 0 | 439.8 | 15.0 | 5 0 | 465.0 | 10.4 |
| 1 3 | 199.6 | 31.8 | 3 3 | 449.1 | 13.5 | 5 3 | 457.7 | 12.0 |
| 1 6 | +220.3 | +31.1 | 3 6 | +457.5 | +12.0 | 5 6 | +449.3 | —13.5 |
| 1 9 | 240.4 | 30.3 | 3 9 | 464.9 | 10.5 | 5 9 | 439.9 | 15.0 |
| 1 12 | 260.0 | 29.5 | 3 12 | 471.3 | 8.9 | 5 12 | 429.6 | 16.4 |
| 1 15 | 279.0 | 28.6 | 3 15 | 476.6 | 7.3 | 5 15 | 418.4 | 17.9 |
| 1 18 | 297.4 | 27.6 | 3 18 | 480.8 | 5.7 | 5 18 | 406.2 | 19.3 |
| 1 21 | +315.2 | +26.6 | 3 21 | +484.0 | + 4.1 | 5 21 | +393.1 | —20.6 |

## COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE IV.

| t |  | x′ | y′ | t |  | x′ | y′ | t |  | x′ | y′ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| d. | h. | ″ | ″ | d. | h. | ″ | ″ | d. | h. | ″ | ″ |
| 6 | 0 | +379.2 | —21.9 | 9 | 18 | —240.1 | —30.3 | 13 | 12 | —457.6 | +12.0 |
| 6 | 3 | 364.4 | 23.1 | 9 | 21 | 259.7 | 29.5 | 13 | 15 | 449.3 | 13.5 |
| 6 | 6 | 348.8 | 24.3 | 10 | 0 | 278.7 | 28.6 | 13 | 18 | 440.0 | 15.0 |
| 6 | 9 | 332.5 | 25.5 | 10 | 3 | 297.2 | 27.6 | 13 | 21 | 429.7 | 16.4 |
| 6 | 12 | 315.4 | 26.6 | 10 | 6 | 315.0 | 26.6 | 14 | 0 | 418.5 | 17.8 |
| 6 | 15 | +297.6 | —27.6 | 10 | 9 | —332.1 | —25.5 | 14 | 3 | —406.3 | +19.2 |
| 6 | 18 | 279.2 | 28.5 | 10 | 12 | 348.4 | 24.4 | 14 | 6 | 393.2 | 20.6 |
| 6 | 21 | 260.2 | 29.4 | 10 | 15 | 363.9 | 23.2 | 14 | 9 | 379.3 | 21.9 |
| 7 | 0 | 240.6 | 30.3 | 10 | 18 | 378.7 | 21.9 | 14 | 12 | 364.6 | 23.1 |
| 7 | 3 | 220.5 | 31.1 | 10 | 21 | 392.7 | 20.6 | 14 | 15 | 349.1 | 24.3 |
| 7 | 6 | +199.9 | —31.8 | 11 | 0 | —405.8 | —19.3 | 14 | 18 | —332.8 | +25.4 |
| 7 | 9 | 178.8 | 32.4 | 11 | 3 | 418.0 | 17.9 | 14 | 21 | 315.7 | 26.5 |
| 7 | 12 | 157.4 | 33.0 | 11 | 6 | 429.3 | 16.5 | 15 | 0 | 298.0 | 27.5 |
| 7 | 15 | 135.6 | 33.5 | 11 | 9 | 439.6 | 15.0 | 15 | 3 | 279.6 | 28.5 |
| 7 | 18 | 113.5 | 33.9 | 11 | 12 | 449.0 | 13.5 | 15 | 6 | 260.5 | 29.4 |
| 7 | 21 | + 91.2 | —34.2 | 11 | 15 | —457.4 | —12.0 | 15 | 9 | —240.9 | +30.3 |
| 8 | 0 | 68.7 | 34.5 | 11 | 18 | 464.8 | 10.5 | 15 | 12 | 220.8 | 31.1 |
| 8 | 3 | 46.0 | 34.7 | 11 | 21 | 471.2 | 8.9 | 15 | 15 | 200.2 | 31.8 |
| 8 | 6 | 23.2 | 34.8 | 12 | 0 | 476.5 | 7.3 | 15 | 18 | 179.2 | 32.4 |
| 8 | 9 | + 0.3 | 34.8 | 12 | 3 | 480.8 | 5.7 | 15 | 21 | 157.7 | 33.0 |
| 8 | 12 | — 22.5 | —34.8 | 12 | 6 | —484.0 | — 4.1 | 16 | 0 | —135.9 | +33.5 |
| 8 | 15 | 45.3 | 34.7 | 12 | 9 | 486.2 | 2.5 | 16 | 3 | 113.8 | 33.9 |
| 8 | 18 | 68.0 | 34.5 | 12 | 12 | 487.3 | — 0.8 | 16 | 6 | 91.5 | 34.2 |
| 8 | 21 | 90.5 | 34.2 | 12 | 15 | 487.3 | + 0.8 | 16 | 9 | 69.0 | 34.5 |
| 9 | 0 | 112.9 | 33.9 | 12 | 18 | 486.3 | 2.4 | 16 | 12 | 46.3 | 34.7 |
| 9 | 3 | —135.0 | —33.5 | 12 | 21 | —484.2 | + 4.0 | 16 | 15 | — 23.5 | +34.8 |
| 9 | 6 | 156.8 | 33.0 | 13 | 0 | 480.9 | 5.7 | 16 | 18 | — 0.6 | 34.8 |
| 9 | 9 | 178.2 | 32.4 | 13 | 3 | 476.6 | 7.3 | 16 | 21 | + 22.2 | 34.8 |
| 9 | 12 | 199.3 | 31.8 | 13 | 6 | 471.3 | 8.9 | 17 | 0 | + 45.0 | +34.7 |
| 9 | 15 | —220.0 | —31.1 | 13 | 9 | —465.0 | +10.5 |  |  |  |  |

## THE APPARENT ELEMENTS OF SATURN'S RING.

| Sidereal Date. 0h. | *a* Outer Major Axis. | *b* Outer Minor Axis. | *p* Inclination of Northern Semiminor Axis to Circle of Declination from North to East. | *l* The Elevation of the Earth above the Plane of the Ring. | *l′* The Elevation of the Sun above the Plane of the Ring. | *u* Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on Equator. | *u′* Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on Ecliptic. |
|---|---|---|---|---|---|---|---|
| | ″ | ″ | ° ′ | ° ′ | ° ′ | ° ′ | ° ′ |
| 0 | 46.57 | 20.92 | —6 5.6 | —26 41.5 | —26 41 8 | 142 14.3 | 98 49.6 |
| 20 | 45.78 | 20.67 | 5 58.1 | 26 50.1 | 26 39.5 | 140 38.9 | 97 15.2 |
| 40 | 44.49 | 20.16 | 5 53.9 | 26 57.0 | 26 36.9 | 139 44.2 | 96 20.7 |
| 60 | 43.01 | 19.55 | 5 53.1 | 27 2.6 | 26 34.0 | 139 32.9 | 96 9 4 |
| 80 | 41.37 | 18.82 | 5 56.0 | 27 3.6 | 26 30.9 | 140 15.0 | 96 41.6 |
| 100 | 39.96 | 18.17 | 6 3.5 | 27 2.4 | 26 27.4 | 141 40.3 | 98 16.9 |
| 120 | 38.82 | 17.60 | 6 13.8 | 26 57.2 | 26 23.7 | 143 42.2 | 100 19.9 |
| 140 | 38.00 | 17.13 | 6 25.5 | 26 47.1 | 26 19.6 | 146 12.5 | 102 49.3 |
| 160 | 37.53 | 16.77 | 6 37.7 | 26 32.5 | 26 15.3 | 148 55.6 | 105 32.5 |
| 180 | 37.41 | 16.50 | 6 49.3 | 26 10.7 | 26 10.7 | 151 47.3 | 108 24.2 |
| 200 | 37.64 | 16.40 | 6 59.3 | 25 49.8 | 26 5.8 | 154 36.6 | 111 13.6 |
| 220 | 38.23 | 16.40 | 7 7.6 | 25 24.5 | 26 0.6 | 157 13.8 | 113 50.9 |
| 240 | 39.14 | 16.54 | 7 13.9 | 25 0.2 | 25 55.2 | 159 30.3 | 116 7.5 |
| 260 | 40.37 | 16.84 | 7 17.9 | 24 39.8 | 25 49.5 | 161 16.4 | 117 53.6 |
| 280 | 41.83 | 17.30 | 7 20.8 | 24 25.6 | 25 43.5 | 162 25.9 | 119 2.2 |
| 300 | 43.40 | 17.90 | 7 21.6 | 24 21.7 | 25 37.2 | 162 47.7 | 119 24.1 |
| 320 | 44.89 | 18 57 | 7 20.9 | 24 26.6 | 25 30.7 | 162 27.3 | 119 4.8 |
| 340 | 46.05 | 19.22 | 7 17.8 | 24 40.2 | 25 23.9 | 161 25.6 | 118 3.1 |
| 360 | 46.63 | 19.74 | 7 14.6 | 25 2.5 | 25 16.8 | 159 44.6 | 116 22.2 |
| 365 | 46.75 | 19.86 | —7 13.8 | —25 8.6 | —25 15.0 | 159 16.8 | 115 54.4 |

Factor which is to be multiplied by *a* and *b* to obtain the axes of

The inner ellipse of the outer Ring = 0.8801 log. Factor = 9.9445
The outer ellipse of the inner Ring = 0.8599 " = 9.9344
The inner ellipse of the inner Ring = 0.6650 " = 9.8228
The inner ellipse of Bond's dusky Ring = 0.5486 " = 9.7392

NOTE.—The sign of *l* indicates whether the visible surface of the Ring is northern or southern

## THE APPARENT DISCS OF VENUS AND MARS.

### The Versed Sines of their Illuminated Portions, divided by their Apparent Diameters.

| 1856. | Venus. | Mars. | 1856. | Venus. | Mars. |
|---|---|---|---|---|---|
| January 15 | 0.656 | 0.907 | July 15 | 1.000 | 0.870 |
| February 15 | 0 759 | 0.935 | August 15 | 0.992 | 0.872 |
| March 15 | 0.838 | 0.985 | September 15 | 0.964 | 0.884 |
| April 15 | 0.903 | 0.991 | October 15 | 0.922 | 0.900 |
| May 15 | 0.952 | 0.933 | November 15 | 0.864 | 0.919 |
| June 15 | 0.986 | 0.886 | December 15 | 0.792 | 0.938 |

## WASHINGTON MEAN TIME.

### PLANETARY CONSTELLATIONS.

| | d. | h. | m. | | ° | ′ |
|---|---|---|---|---|---|---|
| Jan. | 3 | 14 | 15 | ♂ in Aphelion. | | |
| | 3 | 19 | 33 | ☌ ♀ ☾ . . . . . ♀ + | 5 | 22 |
| | 6 | 10 | 29 | ♀ greatest Hel. Lat. N. | | |
| | 7 | 13 | 18 | ☌ ☿ ☾ . . . . . ☿ + | 2 | 54 |
| | 10 | 8 | 57 | ☌ ♃ ☾ . . . . . ♃ + | 3 | 30 |
| | 11 | 5 | 1 | ☌ ♆ ☾ . . . . . ♆ + | 2 | 42 |
| | 11 | 19 | 9 | ☿ greatest Hel. Lat. S. | | |
| | 15 | 16 | 18 | ☌ ♅ ☾ . . . . . ♅ — | 1 | 56 |
| | 18 | 12 | 2 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 15 |
| | 24 | 18 | 42 | ♅ stationary. | | |
| | 27 | 21 | 25 | ☌ ♂ ☾ . . . . . ♂ + | 2 | 0 |
| | 30 | 19 | 8 | ☿ in ☊ | | |
| Feb. | 1 | 11 | 4 | ☿ greatest elong. E. | 18 | 17 |
| | 2 | 17 | 4 | ☌ ♀ ☾ . . . . . ♀ + | 6 | 13 |
| | 4 | 8 | 51 | ☿ in Perihelion. | | |
| | 5 | 19 | 0 | □ ♅ ☉ | | |
| | 6 | 17 | 21 | ☌ ☿ ☾ . . . . . ☿ + | 6 | 24 |
| | 7 | 2 | 40 | ☌ ♃ ☾ . . . . . ♃ + | 3 | 2 |
| | 7 | 9 | 41 | ☿ stationary. | | |
| | 7 | 15 | 27 | ☌ ♆ ☾ . . . . . ♆ + | 2 | 26 |
| | 11 | 22 | 23 | ☌ ♅ ☾ . . . . . ♅ — | 2 | 13 |
| | 14 | 15 | 39 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 19 |
| | 14 | 16 | 58 | ☿ greatest Hel. Lat. N. | | |
| | 16 | 23 | 8 | ☌ ☿ ☉ Inf. | | |
| | 22 | 23 | 1 | ♄ stationary. | | |
| | 23 | 20 | 37 | ♂ stationary. | | |
| | 24 | 12 | 29 | ☌ ♂ ☾ . . . . . ♂ + | 3 | 0 |
| | 29 | 3 | 50 | ☿ stationary. | | |
| March | 2 | 11 | 24 | ♀ in ☋ | | |
| | 3 | 15 | 26 | ☌ ♀ ☾ . . . . . ♀ + | 5 | 10 |
| | 4 | 6 | 35 | ☌ ☿ ☾ . . . . . ☿ + | 6 | 5 |
| | 5 | 1 | 30 | ☌ ♃ ☉ | | |
| | 6 | 0 | 37 | ☌ ♃ ☾ . . . . . ♃ + | 2 | 33 |
| | 6 | 4 | 10 | ☌ ♆ ☾ . . . . . ♆ + | 2 | 20 |
| | 7 | 4 | 30 | ☿ in ☋ | | |
| | 10 | 7 | 40 | ☌ ♅ ☾ . . . . . ♅ — | 2 | 29 |
| | 12 | 22 | 18 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 26 |
| | 13 | 1 | 58 | □ ♄ ☉ | | |
| | 14 | 12 | 31 | ☿ great. elong. W. | 27 | 39 |
| | 16 | 19 | 0 | ☌ ♃ ♆ . . . . . ♃ + | 0 | 2 |
| | 17 | 7 | 0 | ♄ in Perihelion. | | |
| | 19 | 8 | 28 | ☿ in Aphelion. | | |
| | 19 | 16 | 41 | ☉ enters ♈, spring begins. | | |
| | 22 | 8 | 29 | ☌ ♂ ☾ . . . . . ♂ + | 2 | 36 |
| | 30 | 9 | 28 | ☌ ☿ ♆ . . . . . ☿ — | 1 | 28 |
| April | 1 | 8 | 11 | ☍ ♂ ☉ | | |
| | 2 | 0 | 5 | ☌ ☿ ♃ . . . . . ☿ — | 1 | 32 |
| | 2 | 11 | 4 | ☌ ♀ ☾ . . . . . ♀ + | 2 | 17 |
| | 2 | 16 | 52 | ☌ ♆ ☾ . . . . . ♆ + | 2 | 16 |
| | 2 | 22 | 31 | ☌ ♃ ☾ . . . . . ♃ + | 2 | 0 |
| April | 3 | 0 | 51 | ☌ ☿ ☾ . . . . . ☿ + | 0 | 20 |
| | 4 | | | ☉ Eclip. invis. at Wash'n. | | |
| | 5 | 16 | 15 | ♀ in Aphelion. | | |
| | 6 | 19 | 49 | ☌ ♅ ☾ . . . . . ♅ — | 2 | 40 |
| | 8 | 18 | 25 | ☿ greatest Hel. Lat. S. | | |
| | 9 | 8 | 12 | ☌ ♀ ♃ . . . . . ♀ — | 0 | 27 |
| | 9 | 9 | 8 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 31 |
| | 17 | 15 | 56 | ☌ ♂ ☾ . . . . . ♂ + | 0 | 43 |
| | 19 | | | ☾ Eclip. vis. at Wash'ton. | | |
| | 26 | 2 | 27 | ☌ ☿ ☉ Sup. | | |
| | 27 | 18 | 24 | ☿ in ☊ | | |
| | 28 | 7 | 54 | ♀ greatest Hel. Lat S. | | |
| | 30 | 3 | 25 | ☌ ♆ ☾ . . . . . ♆ + | 2 | 12 |
| | 30 | 18 | 19 | ☌ ♃ ☾ . . . . . ♃ + | 1 | 22 |
| May | 2 | 8 | 7 | ☿ in Perihelion. | | |
| | 2 | 9 | 54 | ☌ ♀ ☾ . . . . . ♀ — | 1 | 29 |
| | 2 | 14 | 34 | ☌ ☿ ♅ . . . . . ☿ + | 1 | 11 |
| | 4 | 9 | 0 | ☌ ♅ ☾ . . . . . ♅ — | 2 | 46 |
| | 4 | 15 | 54 | ☌ ☿ ☾ . . . . . ☿ — | 1 | 35 |
| | 6 | 23 | 9 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 30 |
| | 10 | 18 | 12 | ☌ ♅ ☉ | | |
| | 12 | 16 | 14 | ☿ greatest Hel. Lat. N. | | |
| | 14 | 10 | 2 | ♂ stationary. | | |
| | 14 | 15 | 10 | ☌ ♂ ☾ . . . . . ♂ — | 0 | 58 |
| | 26 | 10 | 24 | ☿ greatest elong. E. | 22 | 57 |
| | 26 | 18 | 12 | ☌ ♀ ♅ . . . . . ♀ — | 0 | 47 |
| | 27 | 11 | 13 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 58 |
| | 27 | 18 | 21 | ☌ ☿ ♄ . . . . . ☿ + | 2 | 25 |
| | 28 | 10 | 40 | ☌ ♃ ☾ . . . . . ♃ + | 0 | 40 |
| | 31 | 21 | 6 | ☌ ♅ ☾ . . . . . ♅ — | 2 | 54 |
| June | 1 | 7 | 56 | ☌ ♀ ☾ . . . . . ♀ — | 3 | 58 |
| | 3 | 14 | 26 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 29 |
| | 3 | 20 | 7 | ☌ ☿ ☾ . . . . . ☿ — | 4 | 31 |
| | 5 | 3 | 45 | ☿ in ☋ | | |
| | 8 | 1 | 44 | ☿ stationary. | | |
| | 11 | 8 | 16 | ☌ ♂ ☾ . . . . . ♂ — | 1 | 23 |
| | 12 | 12 | 17 | □ ♆ ☉ | | |
| | 14 | 16 | 45 | ♂ in ☋ | | |
| | 15 | 7 | 43 | ☿ in Aphelion. | | |
| | 16 | 12 | 48 | ☌ ☿ ♄ . . . . . ☿ — | 2 | 21 |
| | 20 | 13 | 30 | ☉ enters ♋, sum'r begins. | | |
| | 20 | 19 | 50 | ☌ ☿ ☉ | | |
| | 23 | 9 | 0 | ♆ stationary. | | |
| | 23 | 14 | 37 | ♀ in ☊ | | |
| | 23 | 17 | 5 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 43 |
| | 24 | 9 | 1 | ☌ ♄ ☉ | | |
| | 24 | 23 | 4 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 3 |
| | 25 | 10 | 8 | ☌ ☿ ♀ . . . . . ☿ — | 4 | 40 |
| | 28 | 6 | 58 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 7 |
| | 28 | 17 | 22 | □ ♃ ☉ | | |

## WASHINGTON MEAN TIME.

### PLANETARY CONSTELLATIONS.

| | d. | h. | m. | | ° | ′ |
|---|---|---|---|---|---|---|
| June | 30 | 15 | 3 | ☌ ☿ ☾ . . . . . ☿ — | 9 | 11 |
| | 30 | 18 | 38 | ☌ ♀ ♄ . . . . . ♀ + | 1 | 0 |
| July | 1 | 5 | 7 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 31 |
| | 1 | 6 | 2 | ☌ ♀ ☾ . . . . . ♀ — | 4 | 31 |
| | 1 | 17 | 31 | ☉ in Apogee. | | |
| | 2 | 7 | 24 | ☿ stationary. | | |
| | 5 | 17 | 41 | ☿ greatest Hel. Lat. S. | | |
| | 9 | 15 | 42 | ☌ ♂ ☾ . . . . . ♂ — | 0 | 44 |
| | 11 | 15 | 18 | □ ♂ ☉ | | |
| | 13 | 11 | 44 | ☿ great. elong. W. | 20 | 27 |
| | 18 | 3 | 31 | ☌ ☿ ♄ . . . . . ☿ — | 0 | 47 |
| | 19 | 11 | 30 | ☌ ♀ ☉ Sup. | | |
| | 20 | 22 | 48 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 28 |
| | 22 | 7 | 52 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 39 |
| | 24 | 17 | 40 | ☿ in ☊ | | |
| | 25 | 14 | 33 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 24 |
| | 27 | 0 | 52 | ♀ in Perihelion. | | |
| | 28 | 18 | 7 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 38 |
| | 29 | 2 | 20 | ♃ stationary. | | |
| | 29 | 7 | 21 | ☿ in Perihelion. | | |
| | 30 | 5 | 7 | ☌ ☿ ☾ . . . . . ☿ — | 4 | 5 |
| | 31 | 8 | 25 | ☌ ♀ ☾ . . . . . ♀ — | 3 | 33 |
| Aug. | 7 | 7 | 24 | ☌ ♂ ☾ . . . . . ♂ + | 0 | 33 |
| | 8 | 15 | 31 | ☿ greatest Hel. Lat. N. | | |
| | 8 | 16 | 33 | ☌ ☿ ☉ Sup. | | |
| | 16 | 1 | 0 | ☌ ☿ ♀ . . . . . ☿ + | 0 | 11 |
| | 17 | 2 | 18 | □ ♅ ☉ | | |
| | 17 | 6 | 18 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 18 |
| | 18 | 2 | 30 | ♀ greatest Hel. Lat N. | | |
| | 18 | 14 | 10 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 56 |
| | 21 | 21 | 0 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 40 |
| | 25 | 5 | 7 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 49 |
| | 29 | 16 | 56 | ♅ stationary. | | |
| | 30 | 18 | 9 | ☌ ♀ ☾ . . . . . ♀ — | 1 | 13 |
| | 31 | 10 | 1 | ☌ ☿ ☾ . . . . . ☿ — | 1 | 43 |
| Sept. | 1 | 3 | 2 | ☿ in ☋ | | |
| | 5 | 3 | 17 | ☌ ♂ ☾ . . . . . ♂ + | 1 | 56 |
| | 11 | 6 | 58 | ☿ in Aphelion. | | |
| | 13 | 15 | 29 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 19 |
| | 14 | 18 | 21 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 50 |
| | 18 | 4 | 0 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 49 |
| | 21 | 14 | 33 | ☌ ♄ ☾ . . . . ♄ — | 5 | 57 |
| | 21 | 23 | 29 | ☿ greatest elong. E. | 26 | 4 |
| | 22 | 3 | 45 | ☉ enters ♎, autumn begins. | | |
| | 26 | 9 | 18 | ☍ ♃ ☉ | | |
| | 28 | – | – | ☉ Eclip. invis. at Wash'n | | |
| | 30 | 7 | 25 | ☌ ♀ ☾ . . . . . ♀ + | 1 | 50 |
| | 30 | 14 | 22 | ☌ ☿ ☾ . . . . . ☿ — | 2 | 7 |
| Oct. | 1 | 16 | 57 | ☿ greatest Hel. Lat. S. | | |
| | 3 | 18 | 47 | ☌ ☿ ♀ . . . . . ☿ — | 4 | 11 |
| Oct. | 4 | 0 | 40 | ☌ ♂ ☾ . . . . . ♂ + | 3 | 3 |
| | 4 | 23 | 19 | ☿ stationary. | | |
| | 6 | 6 | 25 | □ ♄ ☉ | | |
| | 11 | 1 | 21 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 25 |
| | 12 | 0 | 41 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 27 |
| | 13 | – | – | ☾ Eclip. partly vis. at W. | | |
| | 15 | 12 | 27 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 47 |
| | 16 | 21 | 5 | ☌ ☿ ☉ Inf. | | |
| | 18 | 23 | 16 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 58 |
| | 20 | 16 | 55 | ☿ in ☊ | | |
| | 25 | 6 | 37 | ☿ in Perihelion. | | |
| | 25 | 8 | 20 | ☿ stationary. | | |
| | 25 | 16 | 40 | ♄ stationary. | | |
| | 26 | 17 | 55 | ☌ ☿ ☾ . . . . . ☿ + | 2 | 2 |
| | 30 | 16 | 39 | ☌ ♀ ☾ . . . . . ♀ — | 3 | 18 |
| Nov. | 1 | 14 | 45 | ☿ greatest elong. W. | 18 | 42 |
| | 1 | 22 | 14 | ☌ ♂ ☾ . . . . . ♂ + | 3 | 40 |
| | 4 | 14 | 43 | ☿ greatest Hel. Lat. N. | | |
| | 7 | 10 | 11 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 35 |
| | 8 | 6 | 50 | ☌ ♃ ☾ . . . . . ♃ + | 0 | 9 |
| | 11 | 21 | 53 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 41 |
| | 14 | 10 | 0 | ☍ ♅ ☉ | | |
| | 15 | 7 | 46 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 50 |
| | 16 | 7 | 57 | ♀ in Aphelion. | | |
| | 17 | 7 | 0 | ♃ greatest Hel. Lat. S. | | |
| | 18 | 9 | 33 | ♂ greatest Hel. Lat. S. | | |
| | 24 | 2 | 11 | ♃ stationary. | | |
| | 26 | 9 | 11 | ☌ ☿ ☾ . . . . . ☿ + | 3 | 52 |
| | 27 | 10 | 0 | ♆ stationary. | | |
| | 28 | 2 | 15 | ☿ in ☋ | | |
| | 29 | 19 | 55 | ☌ ♀ ☾ . . . . . ♀ + | 3 | 16 |
| | 31 | 19 | 49 | ☌ ♂ ☾ . . . . . ♂ + | 3 | 42 |
| Dec. | 4 | 17 | 6 | ☌ ♆ ☾ . . . . . ♆ + | 1 | 14 |
| | 5 | 14 | 19 | ☌ ♃ ☾ . . . . . ♃ — | 0 | 12 |
| | 8 | 6 | 15 | ☿ in Aphelion. | | |
| | 9 | 0 | 41 | ♀ greatest Hel. Lat. S. | | |
| | 9 | 6 | 35 | ☌ ♅ ☾ . . . . . ♅ — | 3 | 38 |
| | 9 | 11 | 27 | ☌ ☿ ☉ Sup. | | |
| | 11 | 2 | 5 | □ ♆ ☉ | | |
| | 12 | 4 | 15 | ♂ in Perihelion. | | |
| | 12 | 15 | 36 | ☌ ♄ ☾ . . . . . ♄ — | 5 | 40 |
| | 20 | 21 | 31 | ☉ enters ♑, winter begins. | | |
| | 21 | 7 | 0 | ♃ in Perihelion | | |
| | 21 | 11 | 14 | □ ♃ ☉ | | |
| | 27 | 11 | 29 | ☌ ☿ ☾ . . . . . ☿ + | 2 | 50 |
| | 27 | 22 | 48 | ☌ ♀ ♂ . . . . . ♀ — | 0 | 45 |
| | 28 | 16 | 12 | ☿ greatest Hel. Lat. S. | | |
| | 29 | 17 | 53 | ☌ ♂ ☾ . . . . . ♂ + | 3 | 3 |
| | 29 | 19 | 21 | ☌ ♀ ☾ . . . . . ♀ + | 2 | 17 |
| | 31 | 10 | 38 | ☍ ♄ ☉ | | |

# LATITUDES AND LONGITUDES OF THE PRINCIPAL OBSERVATORIES.

COMPILED BY DR. B. A. GOULD.

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Having been requested by Lieutenant Davis to arrange for the Astronomical Ephemeris a Table of Latitudes and Longitudes of the principal Observatories, I have devoted some time and attention to the critical preparation of this catalogue. But since the values decided upon differ considerably in many cases from those in the other published catalogues, and in some few instances from the values which appear to be made use of at the Observatories themselves, I feel some hesitation in publishing them without asking the attention of astronomers to the catalogue, that such inaccuracies as it may contain may be corrected as speedily as possible. The sources of information are given in each case, and when possible the probable error also is given with the determination. One important change consists in the adoption of the differences of longitude between Altona and Pulkowa, and Greenwich and Altona, as determined by Struve in his chronometric expeditions of 1843 and 1844. The adoption of these values necessarily implies a corresponding change for the longitude of those Observatories whose position has been fixed by their difference of longitude from Altona or Pulkowa, or from other Observatories dependent upon these. The differences of longitude of the American Observatories are deduced from the telegraphic determinations of the United States Coast-Survey,—and have been communicated by Professor Bache, by authority of the Honorable Secretary of the Treasury. I have endeavored to include in the list all Observatories now in a state of astronomical activity, or which have been so within the last quarter of a century. Any corrections or additions with which astronomers may favor me will be gratefully acknowledged.

**Åbo.** . . . N. Lat. 60° 26′ 56″.8 ± 0″.11. Argelander, *Obs. Astron.*, I. p. xxi.
Long. E. from Paris, $1^{h}\ 19^{m}\ 47^{s}.3$. *Astr. Nachr.*, IX. 264.

This Observatory was abandoned, and the instruments transferred, together with the University of Finland, to Helsingfors, in consequence of the great fire of 1827, by which the University buildings, library, &c. were destroyed.

**Altona.** . . N. Lat. 53° 32′ 45″.27. Gauss, *Bestimmung des Breiten-Unterschiedes zwischen den Sternwarten von Göttingen und Altona*, p. 71. In the edition of Schumacher's *Hülfstafeln*, published by Warnstorff, Altona, 1845, the latitude of Altona is given p. 114, as +53° 32′ 45″.7.

Long. E. from Greenwich, 0$^{h.}$ 39$^{m.}$ 46$^{s.}$.151 ± 0$^{s.}$.042. Struve, *Expédition Chronometrique executée in* 1844, *entre Altona et Greenwich*, p. 206.

**Athens.** . . N. Lat. 37° 58′ 20″ ± 1″. Bouris, *Astr. Nachr.*, XXXIII. 197.

Long. E. from Paris, 1$^{h.}$ 25$^{m.}$ 34$^{s.}$.23 ± 1$^{s.}$. *Ergänzungs-Heft zu den Astr. Nachr.*, 1849, p. 151. This longitude was obtained from moon-culminating stars observed on ten nights at Athens and Hamburg. The result of a series observed at Athens and Copenhagen gave the longitude of Athens 6$^{s.}$.84 farther East, but this series was rejected. *Ibid.*, pp. 150, 151, 158. Diminishing the E. longitude of Hamburg in conformity with Struve's chronometric determination, we have for the longitude of the meridian-circle 1$^{h.}$ 25$^{m.}$ 33$^{s.}$.73 ± 1$^{s.}$.

The centre of the Observatory is 0$^{s.}$.19 W. from the meridian-circle, *Erg.-Heft z. d. Astr. Nachr.*, p. 152.

**Berlin.** . . N. Lat. 52° 30′ 16″.68 ± 0″.2. Encke, *Astr. Nachr.*, XXIII. 372.

For the Longitude of the centre of the Observatory, we have

| | h. m. s. | |
|---|---|---|
| Berlin E. from Altona, | 0 13 48.78 ± 0.03 | *Berl. Astr. Jahrb.*, |
| Altona E. from Greenwich, | 0 39 46.15 | [1839, p. 275. |
| Berlin " " | 0 53 34.93 | |

The old Observatory was situated 0′ 56″.72 North (*Berl. Astr. Jahrb.*, 1839, p. 242; *Astr. Nachr.*, XXIII. 370), and 0$^{s.}$.39 West (*Ibid.*, pp. 261, 265), of the new one. Hence we have for the old Berlin Observatory,

N. Lat., 52° 31′ 13″.4.
Long. E. from Greenwich, 0$^{h.}$ 53$^{m.}$ 34$^{s.}$.54.

**Bilk.** . . . N. Lat. 51° 12′ 25″. *Astr. Nachr.*, XXVII. 300.

Long. W. from Berlin, 0$^{h.}$ 26$^{m.}$ 30$^{s.}$.0. *Ibid.*

**Bonn.** . . . N. Lat. 50° 43′ 45″.0. } Orally communicated by Prof.
Long. E. from Paris, 0$^{h.}$ 19$^{m.}$ 3$^{s.}$.0. } Argelander to the compiler.

The provisional Observatory on the "Alter Zoll," in which were made the observations published in Vol. I. of the Bonn series, was situated in

N. Lat. 50° 44′ 9″.
Long. E. from Paris, 0$^{h.}$ 19$^{m.}$ 5$^{s.}$.5. *Bonn Astr. Beobb.*, I. p. i.

**Breslau.** . . N. Lat. 51° 6′ 56″.0. (MS. communication from Professor Boguslawski to Professor Encke.) *Berl. Astr. Jahrb.*, 1852, p. 289. The value given in the *Berl. Jahrb.* previously to 1851, was 51° 6′ 30″.0.

The Longitude given in the table is derived from a mean of four determinations of the longitude E. from Paris, viz.: —

| | h. | m. | s. |
|---|---|---|---|
| Triangulation in 1805 (fire-signals), *Astr. Nachr.*, XVI. 371, | 0 | 58 | 48.6 |
| Steczkowski (6 star-immersions), *Ibid.*, | | | 48.17 |
| Hansen (occultations). *Astr Nachr.*, XVII. 170. | | | 48.74 |
| Erman and Petersen (meteors), *Astr. Nachr.*, XIX. 27, | | | 48.67 |
| Mean, Breslau E. from Paris, | 0 | 58 | 48.54 |

**Brussels.** . . . N. Lat. 50° 51′ 10″.7. *Annales de l'Obs. de Bruxelles*, 1837, p. 264.

Long. W. from Greenwich, 0h. 17m. 27s.6. Quetelet, *Mém. de l'Acad. R. de Bruxelles*, XVI. 18.

**Cambridge (Eng.).** N. Lat. 52° 12′ 51″.76. *Camb. Phil. Trans.*, V. 279.

Long. E. from Greenwich, 0h. 0m. 23s.54. *Ibid.*, III. 168.

**Cambridge (Mass.).** N. Lat. 42° 22′ 48″.60. Peirce, *Mem. Amer. Acad.*, *N. S.*, II. 203.

Long. by the telegraphic determinations of the U. S. Coast-Survey,

| Cambridge E. from Stuyvesant Garden, N. Y., | h. | m. | s. |
|---|---|---|---|
| By 34 sets of clock-signals, | 0 | 11 | 26.10 |
| " 10 " " star-signals (Western), | | | 26.13 |
| " 24 " " " (exchanged E. and W.), | | | 25.96 |
| " 17 " " " (Eastern), | | | 26.18 |
| Mean, | 0 | 11 | 26.09 |
| Geodetic reduction to dome of Cambridge Observatory, | | | —0.02 |
| Stuyvesant Garden E. of Jersey City (geodetic), | | 0 | 11.93 |
| Cambridge E. from C. S. Station, Jersey City, | 0 | 11 | 38.00 |
| Jersey City E. from Washington (see Philadelphia), | 0 | 12 | 3.54 |
| Cambridge (dome) E. from Washington, | 0 | 23 | 41.54 |

**Cape of Good Hope.** S. Lat. 33° 56′ 3″. Henderson, *Mem. R. Astr. Soc.*, VI. 130.

Long. E. from Greenwich,

| | h. | m. | s. | | |
|---|---|---|---|---|---|
| By Greenwich Observations, | 1 | 13 | 56.1 | *Ibid.*, | p. 126. |
| " Cambridge " | | | 55.04 | " | p. 127. |
| " Åbo " | | | 58.56 | " | p. 128. |
| " Edinburgh " | | | 54.2 | " | p. 129. |
| Mean, | 1 | 13 | 56.0 | | |

**Christiania.** . . N. Lat. 59° 54′ 43″.7.
Long. E. from Paris, 0h. 33m. 33s.3. } *Astron. Journ.*, II. 173.

**Cincinnati.** . . . N. Lat. 39° 5′ 54″. *Astr. Nachr.*, XXIII. 313.

Long. W. from Washington, 0h. 29m. 46s.85. (U. S. Coast-Survey.) *Proc. Amer. Assoc. for Adv. Science*, Cincinnati, 1851, p. 118.

**Copenhagen.** By Copenhagen Observatory is usually understood the "Round Tower" of the University. The new instruments are, however, mounted in a temporary wooden building known as "Holkens Bastion." (See *Astr. Nachr.*, XIX. 119).

N. Lat. of the Round Tower, 55° 40′ 53″.0. *Astr. Nachr.*, V. 366.

For the Longitude,

| | h. m. s. | |
|---|---|---|
| Holkens Bastion E. from Altona, | | |
| Hansen (*Astr. Nachr.*, VIII. 281), | 0 10 32.585 | 139.88 |
| Schumacher (*Astr. Nachr.*, IX. 463), | 32.565 | 19.42 |
| Mean, | 10 32.583 | |
| Altona E. from Greenwich, | 39 46.151 | |
| Holkens Bastion E. from Greenwich, | 50 18.734 | |
| Round Tower E. from Holkens Bastion (Wurm, *Astr. Nachr.*, III. 438; V. 337), | 0.57 | |
| Round Tower E. from Greenwich, | 0 50 19.30 | |

**Cracow** . N. Lat. 50° 3′ 50″.0 ± 0.09. Weisse, *Astr. Nachr.*, VIII. 175; XVI. 256.

Longitude E. from Paris,

| | h. m. s. | |
|---|---|---|
| Mean of 18 obs. by Wurm (*Astr. Nachr.*, VIII. 459), (6 of the 25 being rejected), | 1 10 28.986 | ± 0.461 |
| Mean of 25 obs. by Steczkowski (*Astr. Nachr.*, XVI. 352), | 30.221 | ± 0.301 |
| Mean of 4 obs. by Steczkowski (*Astr. Nachr.*, XVIII. 332), | 29.760 | ± 0.085 |
| Mean of 16 obs. of three occultations (Steczkowski, *Astr. Nachr.*, X. 232), | 30.95 | ± 0.253 |
| Assigning to each of these determinations a weight proportional to the number of observations from which it was derived, we obtain the mean, | | |
| Cracow E. from Paris, | 1 10 29.78 | |

**Dorpat** . . N. Lat. 58° 22′ 47″.05. Struve, *Observ. Astron.*, VI. p. lx.

| | h. m. s. | |
|---|---|---|
| Long. E. from Paris, | 1 37 32.70. | Wurm, *Astr. Nachr.*, III. 437. |
| | 33.5 | Bessel, " III. 46. |
| Mean, | 1 37 33.1 | |

**Dublin.** . . N. Lat. 53° 23′ 13″.

Long. W. from Greenwich, $0^{h.}\ 25^{m.}\ 22^{s.}$ *Astr. Nachr.*, X. 274.

**Durham.** . N. Lat. 54° 46′ 6″.4.

Long. W. from Greenwich, $0^{h.}\ 6^{m.}\ 18^{s.}.0$. *Astr. Nachr.*, XXVI. 215.

**Edinburgh.** N. Lat. 55° 57′ 23″.2.
Long. W. from Greenwich, $0^{\mathrm{h.}}\ 12^{\mathrm{m.}}\ 43^{\mathrm{s.}}.0$. *Edinb. Observ.*, X. p. v.

**Florence.** N. Lat. 43° 46′ 40″.8. Zach, *Corresp. Astron.*, I. 15.
Long. E. from Paris, $0^{\mathrm{h.}}\ 35^{\mathrm{m.}}\ 40^{\mathrm{s.}}.2$. *Ibid.*, p. 14.

**Geneva.**

| | ° ′ ″ | |
|---|---|---|
| N. Lat. by observations of pole-star, | 46 11 58.72 | ± 0″.1 |
| " " " nadir-point, | 58.97 | ± 0.1 |
| Mean, | 46 11 58.84 | |

Plantamour, *Mém. de la Soc. de Physique et d'Hist. Nat. de Genève*, XI. 15.
Long. E. from Paris, $0^{\mathrm{h.}}\ 15^{\mathrm{m.}}\ 16^{\mathrm{s.}}.22$. *Astr. Nachr.*, XX. 7.

**Georgetown.** N. Lat. 38° 54′ 26″.1. *Astron. Journ.*, I. 69.
Long. W. from Washington, $0^{\mathrm{h.}}\ 0^{\mathrm{m.}}\ 6^{\mathrm{s.}}.20$. *Astron. Journ.*, I. 70.

**Göttingen.** Gauss found, *Best. d. Breit.-Untersch.*, p. 71, for the N. Latitude of the meridian-circle, 51° 31′ 47″.85, with the weight 60.9.

The Longitude of the same Gauss found (*Ibid.*) by his trigonometrical survey to be West of the meridian-circle in Altona by 7.211 Paris Toises. Using Bessel's data we find $1^{\mathrm{s.}}$ = 148.33 Toises, whence we have,

| | h. m. s. |
|---|---|
| Gottingen West of Altona, | 0 0 0.049 |
| Altona East of Greenwich, | 0 39 46.151 |
| Gottingen East of Greenwich, | 0 39 46.102 |

For the old Observatory,
Lat. = + 51° 31′ 55″.6. *Monatl. Corr.*, XXVII. 483.
Long. E. of Paris, $0^{\mathrm{h.}}\ 30^{\mathrm{m.}}\ 25^{\mathrm{s.}}.2$. *Astr. Nachr.*, II. 407, 408.

**Gotha.** (Seeberg.)
N. Lat. 50° 56′ 5″.19. Gauss, *Best. d. Breit.-Untersch.*, p. 80.
For the Longitude E. from Paris,

| | h. m. s. |
|---|---|
| Wurm found by 11 occultations (*Astr. Nachr.*, II. 405), | 0 33 34.8 ± 0.13 |

Peters found (*Astr. Nachr.*, V. 68),

| | | | Weight. |
|---|---|---|---|
| Seeberg East from | Altona, | 3 10.2 | 2 |
| " " | Göttingen, | 3 8.9 | 15 |
| West " | Königsberg, | 39 5.6 | 18 |
| East " | Paris, | 33 34.3 | 24 |
| West " | Vienna, | 22 38.0 | 17 |

Whence, using the present data, we find,

| | |
|---|---|
| Seeberg E. from Paris, | 0 33 33.66 |
| Mean, | 0 33 34.2 |

For the Observatory attached to Professor Hansen's house,
Long. E. from Paris, $0^{\mathrm{h.}}\ 33^{\mathrm{m.}}\ 30^{\mathrm{s.}}.046$. Schumacher, *Astr. Nachr.*, XXIII. 263.

**Greenwich.** . N. Lat. 51° 28′ 38″.2. Airy, *Mem. Astr. Soc.*, XVII. p. 49.
Long. W. from Paris, $0^{h.}\ 9^{m.}\ 21^{s.}.46 \pm 15$. Henderson, *Phil. Trans.*, 1827, p. 286. See also Washington.

**Hamburg.** . N. Lat. 53° 33′ 7″, by geodetical connection with Altona. *Preface to* Rümker's *Catalogue.*
The Longitude given in the table is derived thus:

| | h. | m. | s. |
|---|---|---|---|
| Hamburg E. from Altona (Hansen, *Astr. Nachr.*, VIII. 277), | 0 | 0 | 7.41 |
| Altona E. from Greenwich (Struve, *Exp. Chron. de* 1844), | 0 | 39 | 46.15 |
| Whence Hamburg E. from Greenwich, | 0 | 39 | 53.56 |

**Hudson.** . . N. Lat. 41° 14′ 42″.6. Loomis, *Trans. Am. Phil. Soc.*, N. S., X. 61.
Long. W. from Philadelphia (U. S. Coast-Survey),

| | h. | m. | s. |
|---|---|---|---|
| By 3 sets Eastern clock-signals, | 0 | 25 | 5.72 |
| " 2 " Western " | | | 5.68 |
| | 0 | 25 | 5.70 |
| Philadelphia E. from Washington, | | 7 | 33.64 |
| Hudson W. from Washington, | 0 | 17 | 32.06 |

Professor Loomis deduced from moon-culminations,
Hudson W. from Greenwich, $5^{h.}\ 25^{m.}\ 41^{s.}.3$. *Astr. Journ.*, I. 67.

**Kasan.** . . N. Lat. 55° 47′ 23″.1. *Astr. Nachr.*, XXVIII. 47.
Long. E. from Berlin, $2^{h.}\ 22^{m.}\ 57^{s.}.0$. *Berl. Astr. Jahrb.*, 1854, p. 293.

**Königsberg.** . N. Lat. 54° 42′ 50.″4. Bessel, *Astr. Nachr.*, I. 248.

| | h. | m. | s. | |
|---|---|---|---|---|
| Long. E. from Paris, | 1 | 12 | 38.8 | Wurm, *Astr. Nachr.*, III. 437. |
| | | | 38.93 | Bessel, " III. 46. |
| Mean, | 1 | 12 | 38.9 | |

**Kremsmünster.** N. Lat. 48° 3′ 23″.81 ± 0″.03. *Astr. Nachr.* XXXVII. 271.
Long. E. from Paris, $0^{h.}\ 47^{m.}\ 11^{s.}.96$. Schumacher, *Astr. Nachr.*, XXIII. 263.

**Leipsic.** . . (Pleissenburg.)

| N. Lat. | ° ′ ″ | | Weight. |
|---|---|---|---|
| D'Arrest, *Astr. Nachr.*, XXVIII. 148, | 51 20 20.7 | ±0.36 | 26.37 |
| D'Arrest, *Astr. Nachr.*, XXVIII. 160, | 20.4 | | |

Long. E. from Greenwich, $0^{h.}\ 49^{m.}\ 28^{s.}.5$.

**Leyden.** . . N. Lat. 52° 9′ 28″.16 ± 0″.15 } Kaiser, *Astr. Nachr.*,
Long. E. from Paris, $0^{h.}\ 8^{m.}\ 35^{s.}.97 \pm 0^{s.}.19$ } XVII. 100.

**Liverpool.** . N. Lat. + 53° 24′ 47″.72. *M. Notices Astr. Soc.* XIII., 247.
Long. W. from Greenwich, $0^{h.}\ 12^{m.}\ 0^{s.}.11$ *Naut. Alm.*, 1852, p. 598.

**London.** . (Mr. Bishop's Observatory.)

N. Lat. 51° 31′ 29″.8. *Astr. Obs. at the Observatory South Villa*, p. xix.

Long. W. from Greenwich, 0h. 0m. 37s.1.

**Madras.** . N. Lat. 13° 4′ 9″.2.

Long. E. from Greenwich, 5h. 20m. 57s. TAYLOR, *Madras General Catal.*, 1844, *Pref.* p. ii.

**Mannheim.** N. Lat. 49° 29′ 12″.9. *Astr. Nachr.*, XII. 129.

Long. E. from Paris, as determined

| | h. m. s. |
|---|---|
| By WURM, from occultations (*Astr. Nachr.*, VIII. 458), | 0 24 29.92 |
| " connection with Strasburg (*Astr. Nachr.*, XV. 280), | 29.87 |
| " " " Vienna (*Astr. Nachr.*, XV. 279; XXIII. 263), | 30.28 |
| By connection with Dunkirk (MÜFFLING, *Astr. Nachr.*, XV. 279), | 30.05 |
| By OLUFSEN from Solar Eclipse (*Astr. Nachr.*, XXII. 234), | 30.10 |
| Mean, | 0 24 30.04 |

**Markree.** . N. Lat. 54° 10′ 31″.72. *Astr. Journ.*, II. 12.

Long. W. from Greenwich, 0h. 33m. 48s.4. *Naut. Alm.*, 1852, p. 598.

**Marseilles.** N. Lat. 43° 17′ 49″. *Monatl. Corresp.*, XIII. 139.

Long. E. from Paris, according to

| | No. Obs. | h. m. s. |
|---|---|---|
| LINDENAU (*Monatl. Corr.*, XIX. 421), | 4 | 0 12 7.7 |
| WURM (*Monatl. Corr.*, XXVI. 185), | 19 | 7.6 |
| " (*Astr. Nachr.*, IV. 33), | 12 | 7.5 |
| INNES (*Astr. Nachr.*, VIII. 435), | 4 | 7.05 |
| Mean, | | 0 12 7.53 |

**Milan.** . (Brera.)

N. Lat. 45° 28′ 0″.7. *Corresp. Astron.*, V. 300; *Effem. Astr. di Milano*, 1846, *App.*, pp. 73–86.

Long. E. from Paris,

| | m. s. | h. m. s. |
|---|---|---|
| DAUSSY found from 31 occultations (*Conn. d. Temps*, 1836, *Add.*, p. 131), | | 0 27 24.91 |
| LITTROW found Milan W. from Vienna (*Ibid.*), | 28 45.63 | |
| | 56 11.07 | |
| | | 0 27 25.44 |
| Mean, | | 0 27 25.18 |

**Modena.** . N. Lat. 44° 38′ 52″.75. BIANCHI, *Astr. Nachr.*, XVI. 221; *Atti del R. Osserv. di Modena*, I. 336 (1834).

Long. E. from Milan, 0h. 6m. 55s.99. *Id.*, p. 337.

Hence E. from Paris,

| | h. m. s. | |
|---|---|---|
| By comparison with Milan, | 0 34 20.45 | |
| Wurm from occultations, | 23.5 | *Astr. Nachr.*, I. 504. |
| " " " | 24.5 | " III. 222. |
| Steczkowski from occultations, | 21.81 | " XVI. 299, 302. |
| Olufsen from solar eclipse, | 22.32 | " XXII. 234. |
| Mean, | 0 34 22.51 | |

**Moscow.** . N. Lat. 55° 45′ 19″.8. Schweizer, *Astr. Nachr.*, XXVII. 215.

| | h. m. s. | |
|---|---|---|
| Long. Moscow E. from Pulkowa, | 0 28 58.2 | *Astr. Nachr.*, XXIV. 90. |
| Pulkowa E. from Greenwich, | 2 1 19.09 | |
| Moscow " " " | 2 30 17.29 | |

**Munich.** . (Bogenhausen.)
N. Lat. 48° 8′ 45″.. Soldner, *Astr. Nachr.*, IX. 422.
Long. E. from Paris, 0h. 37m. 4s.98. *Astr. Nachr.*, VIII. 148.

**Naples.** . N. Lat. 40° 51′ 46″.63. Brioschi, *Astr. Nachr.*, V. 294.
The Longitude adopted is that by which Peters has apparently made his reductions, *Astr. Nachr.*, XXIII. 302, 303, according to which we have,
Naples E. from Berlin, 0h. 3m. 26s.0.
For determinations from solar eclipses by Brioschi and Santini, see *Astr. Nachr.*, VI. 413.

**Oxford.** . N. Lat. 51° 45′ 36″.0
Long. W. from Greenwich, 0h. 5m. 2s.6 } *Naut. Alm.*, 1852, p. 599.

**Padua.** . N. Lat. 45° 24′ 2″.5. Santini, *Astr. Nachr.*, VI. 411; XVII. 346.

| Long. E. from Paris, | h. m. s. | h. m. s. |
|---|---|---|
| Wurm (*Astr. Nachr.*, IV. 347), | | 0 38 7.7 |
| Padua E. from Milan by powder signals (Fallon, *Astr. Nachr.*, IV. 115), | 0 10 43.27 | |
| Milan E. from Paris, | 27 24.18 | |
| | | 0 38 7.45 |
| Mean, Padua E. from Paris, | | 0 38 7.57 |

**Palermo.** . N. Lat. 38° 6′ 44″. Cacciatore, *Del Real Osservatorio di Palermo Libri* VII., VIII., IX., p. 2; *Storia Celeste del R. Osserv. di Palermo*, in *Ann. d. Wiener Sternwarte*, XXIV. 6.
Long. E. from Paris, 0h. 44m. 4s.0. Daussy, *Add. Conn. d. Temps*, 1835, p. 8.

Bianchi, *Astr. Nachr.*, XVII. 350, calls the latitude of the Palermo Observatory, +38° 6′ 25″.50.

**Paramatta.** S. Lat. 33° 48′ 49″.79. Rümker, *Phil. Trans.*, 1829, Part III. p. 16.
Long. E. from Greenwich, 10h. 4m. 6s.25. *Ibid.*, p. 29.

**Paris.** . . N. Lat. 48° 50′ 13″.2. *Conn. d. Temps*, 1835, p. 356.
Long. as above under Greenwich.

**St. Petersburg.** (Academy.)
N. Lat. 59° 56′ 29″.67.
Long. W. from Pulkowa, $0^{m.}$ $5^{s.}$.194. STRUVE, *Description de l'Obs. de Poulkova*, p. 292.

**Philadelphia.** N. Lat. 39° 57′ 7″.5. MS. communication from Professor KENDALL.
Long. E. from Washington (U. S. Coast Survey),

| | m. | s. |
|---|---|---|
| By 5 sets Eastern clock-signals, | 7 | 33.66 |
| " " Western " | | 33.60 |
| Mean, | 7 | 33.63 |

Long. Jersey City Station E. from Washington,

| | m. | s. |
|---|---|---|
| By 2 sets Eastern clock-signals, | 12 | 3.58 |
| " " Western " | | 3.52 |
| Mean, | 12 | 3.56 |

Long. W. from Jersey City Station,

| | m. | s. |
|---|---|---|
| By 8 sets Eastern clock-signals, | 4 | 29.91 |
| " " " " " | | 29.84 |
| Mean, | 4 | 29.88 |

Hence we may use,

| | h. | m. | s. |
|---|---|---|---|
| Jersey City Station E. from Philadelphia, | 0 | 4 | 29.89 |
| " " " Washington, | 0 | 12 | 3.53 |
| Philadelphia, " " | 0 | 7 | 33.64 |

**Prague.** . . N. Lat. 50° 5′ 18″.5. DAVID, *Astr. Nachr.*, VIII. 198.
Long. E. from Paris,

| | h. | m. | s. | |
|---|---|---|---|---|
| Mean of 6 occultations (*Astr. Nachr.*, XVI. 299, 302), | 0 | 48 | 21.66 | ± 4.15 |
| HANSEN from occultations (*Astr. Nachr.*, XVII. 170), | | | 19.59 | ± 3.67 |
| Mean, Prague E. from Paris, | 0 | 48 | 20.50 | |

**Pulkowa.** . N. Lat. 59° 46′ 18″.70. STRUVE, *Descr. de l'Obs. de Poulkova*, p. 290.

| | h. | m. | s. | |
|---|---|---|---|---|
| Long. E. from Altona (*Exp. Chron. de* 1843, p. 144), | 1 | 21 | 32.523 | ± 0.039 |
| Altona E. from Greenwich (*Exp. Chron. de* 1844, p. 206), | 0 | 39 | 46.151 | ± 0.042 |
| Pulkowa E. from Greenwich (*Exp. Chron. de* 1844, p. ix.), | 2 | 1 | 18.674 | ± 0.057 |

**Rome.** . . (Collegio Romano.)
N. Lat. 41° 53′ 54″. *Conn. d. Temps*, 1840, p. 354.
Long. E. from Greenwich, $0^{h.}$ $49^{m.}$ $54^{s.}$.7. *Astr. Nachr.*, VIII. 88.

**San Fernando.** N. Lat. 36° 27′ 45″. *Corresp. Astron.*, XIV. 240.
Long. W. from Paris, $0^{h.}\ 34^{m.}\ 10^{s}.6 \pm 0^{s}.31$. *Astr. Nachr.*, IX. 358.

**Santiago.** . (Observatory of the U. S. Astronomical Expedition.)
S. Lat. 32° 26′ 24″.8. Gilliss, *Astron. Journ.*, III. 55.
Long. W. from Greenwich, $4^{h.}\ 42^{m.}\ 18^{s}.9$. Gilliss, *Astron. Journ.*, II. 118.

**Senftenberg.** . N. Lat. 50° 5′ 10″.1.
Long. E. from Berlin, $0^{h.}\ 12^{m.}\ 15^{s}$. } *Astr. Nachr.*, XXXI. 174, 331.

**Vienna.** . . N. Lat. 48° 12′ 35″.5. *Berl. Astr. Jahrb.*, 1852, p. 290.
Long. E. from Paris, $0^{h.}\ 56^{m.}\ 11^{s}.07$. Schumacher, *Astr. Nachr.*, XXIII. 263.

**Washington.** . N. Lat. 38° 53′ 39″.25. *Astron. Journ.*, III. 12.
Long. W. from Greenwich, as derived from data of the U. S. Coast Survey, up to 1852, $5^{h.}\ 8^{m.}\ 11^{s}.2$.
Lieutenant Maury uses $5^{h.}\ 8^{m.}\ 10^{s}.17$. *Astron. Journ.*, III. 12.

The situation of the first, or provisional, Naval Observatory, in which were made the observations published by Lieutenant Gilliss was,
N. Lat. 38° 53′ 32″.8. Gilliss, *Astr. Obs.*, p. viii.
Long. W. from Greenwich, $5^{h.}\ 8^{m.}\ 4^{s}.6$. *Ibid.*, p. x.

**Wilna.** . . N. Lat. 54° 40′ 59″.1. *Astr. Nachr.*, IV. 562.
Long. E. from Paris,

| | h. | m. | s. |
|---|---|---|---|
| Wurm from 22 occultations (*Astr. Nachr.*, VIII. 96), | 1 | 31 | 50.4 |
| Steczkowski from 1 occultation (*Astr. Nachr.*, XVI. 302), | | | 48.3 |
| Mean, | 1 | 31 | 50.31 |

These results are arranged in the following Table for reference.

## ADDENDUM.

**Olmutz.** . . N. Lat. 49° 35′ 40″.
Long. E. from Greenwich, $1^{h.}\ 9^{m.}\ 0^{s}.1$. } *Astr. Nachr.*, XXXVII. 77.

## POSITIONS OF THE PRINCIPAL OBSERVATORIES.

(*North Latitudes and West Longitudes are considered as positive.*)

| Place. | Latitude. | Longitude from Washington in Time. | Longitude from Washington in Arc. | Longitude from Greenwich in Arc. |
|---|---|---|---|---|
| | ° ′ ″ | h. m. s. | ° ′ ″ | ° ′ ″ |
| Åbo, | +60 26 56.8 | — 6 37 20.0 | 260 40 0.6 | 337 42 48.6 |
| Altona, | +53 32 45.3 | — 5 47 57.4 | 273 0 39.8 | 350 3 27.8 |
| Athens, | +37 58 20 | — 6 43 6.4 | 259 13 24.2 | 336 16 12.2 |
| Berlin, | +52 30 16.7 | — 6 1 46.1 | 269 33 28.1 | 346 36 16.1 |
| Bilk, | +51 12 25 | — 5 35 16.1 | 276 10 58.1 | 353 13 46.1 |
| Bonn, | +50 43 45.0 | — 5 36 35.7 | 275 51 5.1 | 352 53 53.1 |
| Breslau, | +51 6 56.0 | — 6 16 21.2 | 265 54 42.0 | 342 57 30.0 |
| Brussels, | +50 51 10.7 | — 5 25 38.8 | 278 35 18.0 | 355 38 6.0 |
| Cambridge (Eng.), | +52 12 51.8 | — 5 8 34.7 | 282 51 18.9 | 359 54 6.9 |
| Cambridge (Mass.), | +42 22 48.6 | — 0 23 41.5 | 354 4 36.9 | 71 7 24.9 |
| Cape of Good Hope, | —33 56 3 | — 6 22 7.2 | 264 28 12.3 | 341 31 0.3 |
| Christiania, | +59 54 43.7 | — 5 51 6.0 | 272 13 30.6 | 349 16 18.6 |
| Cincinnati, | +39 5 54 | + 0 29 46.9 | 7 26 42.8 | 84 29 30.8 |
| Copenhagen, | +55 40 53.0 | — 5 58 30.5 | 270 22 22.5 | 347 25 10.5 |
| Cracow, | +50 3 50.0 | — 6 28 2.4 | 262 59 23.4 | 340 2 11.4 |
| Dorpat, | +58 22 47.1 | — 6 55 5.8 | 256 13 33.6 | 333 16 21.6 |
| Dublin, | +53 23 13 | — 4 42 49.2 | 289 17 42.0 | 6 20 30.0 |
| Durham, | +54 46 6.4 | — 5 1 53.2 | 284 31 42.0 | 1 34 30.0 |
| Edinburgh, | +55 57 23.2 | — 4 55 28.2 | 286 7 57.0 | 3 10 45.0 |
| Florence, | +43 46 40.8 | — 5 53 12.9 | 271 41 47.1 | 348 44 35.1 |
| Geneva, | +46 11 58.8 | — 5 32 48.9 | 276 47 46.8 | 353 50 34.8 |
| Georgetown, | +38 54 26.1 | + 0 0 6.2 | 0 1 33.0 | 77 4 21.0 |
| Göttingen, | +51 31 47.9 | — 5 47 57.3 | 273 0 40.5 | 350 3 28.5 |
| Gotha, | +50 56 5.2 | — 5 51 6.9 | 272 13 17.1 | 349 16 5.1 |
| Greenwich, | +51 28 38.2 | — 5 8 11.2 | 282 57 12.0 | 0 0 0 |
| Hamburg, | +53 33 7 | — 5 48 4.8 | 272 58 48.6 | 350 1 36.6 |
| Hudson, | +41 14 42.6 | + 0 17 32.1 | 4 23 0.9 | 81 25 48.9 |
| Kasan, | +55 47 23.1 | — 8 24 43.1 | 233 49 13.1 | 310 52 1.1 |
| Königsberg, | +54 42 50.4 | — 6 30 11.6 | 262 27 6.6 | 339 29 54.6 |
| Kremsmünster, | +48 3 23·8 | — 6 4 44.6 | 268 48 50.7 | 345 51 38.7 |
| Leipsic, | +51 20 20.7 | — 5 57 39.7 | 270 35 4.5 | 347 37 52.5 |
| Leyden, | +52 9 28.2 | — 5 26 8.6 | 278 27 50.6 | 355 30 38.6 |
| Liverpool, | +53 24 47.7 | — 4 56 11.1 | 285 57 13.7 | 3 0 1.7 |
| London, | +51 31 29.8 | — 5 7 34.1 | 283 6 28.5 | 0 9 16.5 |
| Madras, | +13 4 9.2 | —10 29 8.2 | 202 42 57.0 | 279 45 45.0 |
| Mannheim, | +49 29 12.9 | — 5 42 2.7 | 274 29 19.5 | 351 32 7.5 |
| Markree, | +54 10 31.7 | — 4 34 22.8 | 291 24 18.0 | 8 27 6.0 |
| Marseilles, | +43 17 49 | — 5 29 40.2 | 277 34 57.2 | 354 37 45.2 |
| Milan, | +45 28 0.7 | — 5 44 57.8 | 273 45 32.4 | 350 48 20.4 |
| Modena, | +44 38 52.8 | — 5 51 55.2 | 272 1 12.5 | 349 4 0.5 |
| Moscow, | +55 45 19.8 | — 7 38 28.5 | 245 22 52.7 | 322 25 40.7 |
| Munich, | +48 8 45 | — 5 54 37.6 | 271 20 35.4 | 348 23 23.4 |
| Naples, | +40 51 46.6 | — 6 5 12.1 | 268 41 58.1 | 345 44 46.1 |
| Oxford, | +51 45 36.0 | — 5 3 8.6 | 284 12 51.0 | 1 15 39.0 |
| Padua, | +45 24 2.5 | — 5 55 40.2 | 271 4 56.6 | 348 7 44.6 |
| Palermo, | +38 6 44 | — 6 1 36.7 | 269 35 50.1 | 346 38 38.1 |

| Place. | Latitude. | Longitude from Washington in Time | Longitude from Washington in Arc. | Longitude from Greenwich in Arc. |
|---|---|---|---|---|
|  | ° ′ ″ | h. m. s. | ° ′ ″ | ° ′ ″ |
| Paramatta, | —33 48 49.8 | +8 47 42.6 | 131 55 38.3 | 208 58 26.3 |
| Paris, | +48 50 13.2 | —5 17 32.7 | 280 36 50.1 | 357 39 38.1 |
| St. Petersburg, | +59 56 29.7 | —7 9 24.7 | 252 38 49.8 | 329 41 37.8 |
| Philadelphia, | +39 57 7.5 | —0 7 33.6 | 358 6 35.4 | 75 9 23.4 |
| Prague, | +50 5 18.5 | —6 5 53.2 | 268 31 42.6 | 345 34 30.6 |
| Pulkowa, | +59 46 18.7 | —7 9 29.9 | 252 37 31.9 | 329 40 19.9 |
| Rome, | +41 53 54 | —5 58 5.9 | 270 28 31.5 | 347 31 19.5 |
| San Fernando, | +36 27 45 | —4 43 22.1 | 289 9 29.1 | 6 12 17.1 |
| Santiago, | —33 26 24.8 | —0 25 52.3 | 353 31 55.5 | 70 34 43.5 |
| Senftenberg, | +50 5 10.1 | —6 14 1.1 | 266 29 43.1 | 343 32 31.1 |
| Vienna, | +48 12 35.5 | —6 13 43.7 | 266 34 4.1 | 343 36 52.1 |
| Washington, | +38 53 39.3 | —0 0 0 | 0 0 0 | 77 2 48.0 |
| Wilna, | +54 40 59.1 | —6 49 23.0 | 257 39 15.5 | 334 42 3.5 |

## ADDENDUM.

| Place. | Latitude. | Longitude from Washington in Time | Longitude from Washington in Arc. | Longitude from Greenwich in Arc. |
|---|---|---|---|---|
| Olmutz, | +49° 35′ 40″.0 | —6h. 17m. 11s.3 | 265° 42′ 10″.5 | 342° 44′ 58″.5 |

# ON THE ARRANGEMENT AND USE OF THE TABLES IN THIS EPHEMERIS.

THIS Ephemeris is divided into two distinct parts. One part is designed for the special use of NAVIGATORS, and is adapted to the Meridian of Greenwich.

The other part is suited to the convenience of ASTRONOMERS, on this continent particularly, and is adapted to the Meridian of Washington.

## THE NAUTICAL PART.

This part contains the Ephemeris of the Sun and Moon; the Distances of the Moon from the centres of the Sun and the four most conspicuous Planets, and from certain Fixed Stars; the Ephemeris of the Planets Venus, Mars, Jupiter, and Saturn; and also an improved method of finding the error and rate of a chronometer by equal altitudes, which is given in an Appendix.

*Time.* — Astronomers make use of three kinds of time, Sidereal Time, Mean Time, and True or Apparent Time. As there is frequent occasion to pass from one to another of these modes of reckoning time, the explanation of their nature, and of the manner of doing this, properly precedes an explanation of the uses of the Ephemeris.

*Sidereal Time* is measured by the successive returns of the mean place of a star to the meridian. These returns are precisely equal, and the mean daily motion of the star is uniform; or, in other words, the diurnal rotation of the earth on its axis is strictly uniform.

The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the vernal equinox over the superior meridian, and terminating with its return to the same point. The daily change, therefore, in the right ascension of the vernal equinox caused by the motion of precession in right ascension, produces a difference between the length of the sidereal day thus adopted, and the true sidereal or *star* day. But this change is annually about $50''$, or $3^{s}.3$ in time, so that the daily change is less than $0^{s}.01$, and is wholly insensible.

*True* or *Apparent Time* is measured by the successive returns of the sun to the meridian of the place of observation. The interval between these returns is called a Solar Day, and the hour angle of the sun, or its distance from the meridian, is called Solar Time. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the meridian are not exactly equal, but depend upon the variable motion of the sun in right ascension.

The want of uniformity in the sun's motion in right ascension arises from two different causes: one, that the sun does not move in the equator, but in the ecliptic; the other, that the sun's motion in the ecliptic is not uniform.

To avoid the irregularity in time caused by the want of uniformity in the sun's motion, a fictitious sun, called a *Mean Sun*, is supposed to move in the equator with a uniform velocity.

*Mean Time*, which is perfectly equable in its increase, is denoted by the motion of this *mean sun;* the latter at certain periods agrees with the real sun, then again is in advance of it, and at other times is behind it.

The difference between the *true* and *mean* time is called the *Equation of Time*, which is always expressed in mean time. By means of it we pass from *true* to *mean* time, or the reverse. Thus, if the *true* time be given, the *mean* time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found. If the *mean* time be given, the *true* time is obtained by applying the equation of time in the sense opposite to that directed by this precept. These transformations are algebraically expressed as follows:—

*mean time* = *true time* + *equation of time;*
*true time* $\doteq$ *mean time* — *equation of time.*

*Day.*—According to the customs of society, the hours are counted from 0 to 12 from noon to midnight, after which they are again reckoned from 0 to 12 from midnight to noon. The *civil day* consists of twenty-four hours, but is divided in this manner into two periods, commencing at midnight. In this respect it differs from the *astronomical day*, which commences at noon. The *civil day* comprises twenty-four hours, from one midnight to the next following. The first period of twelve hours is marked A. M., the last period of twelve hours is marked P. M. The *astronomical day* also comprises twenty-four hours, but they are counted from 0 to 24, and from the noon of one day to that of the next following.

The civil day begins twelve hours before the astronomical day; therefore the first part of the *civil day* answers to the last part of the preceding *astronomical day*, and the last part of the *civil day* to the first part of the same *astronomical day*. Thus, January 10th, $2^{h.}$ A. M., *civil day*, is January 9th, $14^{h.}$, *astronomical day;* and January 9th, $2^{h.}$ P. M., *civil day*, is also January 9th, $2^{h.}$, *astronomical day.* The rule, then, for the transformation of the civil time into astronomical time is this: if the civil time is marked A. M., take one from the date, and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.

The Nautical part of the Calendar is divided into twelve months, and to each month are assigned eighteen pages, of which the contents are as follows:—

Pages I., II., III. are devoted to the Ephemeris of the Sun. Page I. contains, first, the *Apparent Right Ascension and Declination* of the sun at Greenwich apparent noon.

The former of these quantities is used for finding the error of a clock regulated to sidereal time. The difference between the time by the clock of the meridian passage of the sun, and the sun's right ascension reduced to mean noon, is the error of the clock from sidereal time. It is also employed in determining the time by the transit of a fixed star over the meridian, as is explained in page 223 of Bowditch's *American Practical Navigator.* The use of the sun's declination in finding the magnetic amplitude and azimuth, the latitude by altitudes of the sun in and out of the meridian, the time, &c., is also so clearly defined in this standard work, which is in the hands of all American seamen, that any further explanation in this place is unnecessary. Adjoining the columns of *Right Ascension* and *Declination* are the differences of these quantities for one hour (at noon), by means of which they may be calculated for any time out of the meridian, by multiplying this difference by the hours and parts of hours from noon, and adding the amount to, or subtracting it from, the quantity at noon, according as it is increasing or decreasing. If, for example, the declination of the sun were required at $3^{h.}$ $40^{m.}$ P. M., of Friday, January 18th, 1856, the declination of the sun would be taken out first for

| | |
|---|---|
| January 18th, at noon, | 20° 38′ 50″.0 S. |
| From which subtract the diff. for 1 hour, 30″.13, multiplied by 3, | 1 30.4 |
| | 20 37 19.6 |
| And the proportional part for 40 minutes, | 20.1 |
| The result is the sun's declination on the 18th, at $3^{h.}$ $40^{m.}$ P. M., | 20 36 59.5 |

The difference for one hour is not the same for every hour in the twenty-four; but being given in the pages of this ephemeris for the first hour of the day, it is sufficiently accurate for the purposes of the navigator.

The column of the *Sun's Semidiameter* requires no explanation.

The column headed *Sidereal Time of the Semidiameter passing the Meridian*, is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. If the western limb has been observed, the quantity found in this column is to be added to the time of transit over the middle wire, or the mean of the times of transit over all the wires; but if the eastern limb has been observed, the quantities in this column are to be subtracted.

The next column contains the *Equation of Time*, which, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the *apparent time*, or the time given by an observation of the sun, to obtain the *mean time*, or the time shown by a clock. The heading of the column directs the manner in which the equation is to be applied, and where there is a change in the course of the month from addition to subtraction, or the reverse, as in the months of April and June, the two different directions are separated by a line, while a corresponding line below points out the date at which the change takes place. The difference for one hour is given in an adjoining column, by means of which the equation for any time from noon is easily obtained. If, for example, the equation of time for January 16th, at $3^{h.}$ $20^{m.}$ P. M., were required, we should have

| | m. s. |
|---|---|
| Equation for January 16, at noon, | 9 54.20 |
| Correction for $3^{h.}$ $20^{m.}$ (additive), | 2.88 |
| Equation, January 16, at $3^{h.}$ $20^{m.}$ P. M., | 9 57.08 |

Which, according to the rule at the head of the column, is *to be added* to *apparent time* to obtain *mean time*.

Page II. contains the Apparent Right Ascension and Declination of the Sun, and the Equation of Time for Greenwich *Mean* Noon; to these is added a column containing the Sidereal Time of Mean Noon.

Page III. contains the Longitude and Latitude of the Sun, and the Logarithm of the Distance of the Earth, at Greenwich Mean Noon of each day. The Longitude is given in two columns headed $\lambda$ and $\lambda'$; the one, $\lambda$, is the Sun's longitude counted from the true equinox of the date; the other, $\lambda'$, is the same coördinate counted from the mean equinox of the beginning of the year. A column of hourly differences enables the computer to obtain the Sun's longitude for any hour from noon. The hourly differences of the logarithm of the Radius Vector are likewise given. The longitudes of the Sun are the true longitudes, not affected by aberration. The last column on this page contains the Mean Time of Sidereal Noon.

Page IV. of the Nautical part contains the Moon's *Semidiameter* and *Horizontal Parallax* for every noon and midnight. The former may be corrected for any time between the dates for which it is given in the Ephemeris, by means of Table XI. of Bowditch's *Navigator*, or simply by computing the proportional part.

This is readily done by considering that the semidiameter is given for every twelve hours, that the difference, therefore, between any two successive semidiameters corresponds to twelve hours, and that the difference required (or correction) is that difference which corresponds to a time less than twelve hours. If, for example, the semidiameter of the moon is to be taken out for 9 o'clock, P. M. of the 3d of January, then we say that as twelve hours is to 6″.3, the whole difference between the semidiameters at noon and midnight of the 3d, so is nine hours to 4″.7, the correction to be *added* to the semidiameter at noon, because it is increasing; the moon's semidiameter, then, for Jan. $3^{d.}\ 9^{h.}$ is 15′ 24″.9. Adjoining the columns containing the Moon's *Horizontal Parallax* for noon and midnight, are columns giving the change which these quantities undergo in one hour. The sign plus or minus (+ or —) is prefixed to these differences, showing whether they are additive or subtractive, or, in other words, whether the horizontal parallax is increasing or decreasing. In order to reduce the parallax to any time intermediate between those dates for which it is given in the Ephemeris, the mode of proceeding is that which has been already explained in the case of the equation of time. The Moon's *Meridian Passage*, which is given on this page to minutes and tenths of minutes, is also accompanied with a column of differences for one hour, by means of which, having the longitude turned into time, the time of the moon's meridian passage at any other place may be computed. Or it may be more quickly derived from Bowditch's Table XVIII., by simple inspection. The last column of this page contains the *Age* of the Moon, to tenths of days, or the time elapsed since the preceding new moon. It requires no explanation.

The pages from V. to XII. inclusive are taken up with the Moon's *Right Ascension and Declination*, which are given for every hour of every day in the month, and are accompanied with columns of differences for every minute of each hour. The right ascension and declination of the moon change so rapidly, that, if they were not given at frequent intervals, the moon would cease to be useful to the practical navigator as a means of determining the latitude and time. These quantities are wanted for Greenwich mean time, which is either taken directly from the face of a well-regulated chronometer, or is obtained by applying the longitude, turned into time, to the local time of the computer. They have only to be corrected for the minutes and seconds of the time at Greenwich. Thus, if the right ascension and declination of the moon were required for Tuesday, January $1^{d.}\ 8^{h.}\ 10^{m.}$, we have only to add to the right ascension at $8^{h.}$ as given in the Ephemeris, viz. to $13^{h.}\ 34^{m.}\ 33^{s.}.06$, the product of the difference for one minute in the adjoining column multiplied by 10, the product, that is, of $1^{s.}.8467$ by 10, or $18^{s.}.47$; the result is the moon's right ascension at the required time, equal to $13^{h.}\ 34^{m.}\ 51^{s.}.53$. If we were to take out the declination for the same date, the correction for the ten minutes above the hour would also be additive, because the declination, like the right ascension, is increasing; thus,—

| | |
|---|---|
| Moon's declination for January $1^{d.}\ 8^{h.}$ | 9° 19′ 30″.7 S. |
| Correction for $10^{m.}$ is 135″.9, or | 2 15.9 |
| Moon's declination for January $1^{d.}\ 8^{h.}\ 10^{m.}$ | 9 21 46.6 |

The last page of the right ascensions and declinations contains the *Phases* of the Moon, and the dates of the Moon's *Perigee* and *Apogee*, or least and greatest distance from the earth.

The remaining six pages of the month are occupied by the *Lunar Distances*. They are given in the same manner as in the British *Nautical Almanac*, in order to conform to the rules of Bowditch's *Navigator*. These tables contain the geocentric distances of the centre of the moon from the sun, the larger planets, and certain fixed stars, at intervals of three hours, beginning with the noon of each day. All the distances that can be observed on the same day are grouped together under that date, and the letters E. and W. are affixed to the name of the star or planet, to indicate whether they are on the east or west side of the moon. The columns are read from the left to the right, across both pages of the same opening. The principle of determining the longitude by means of lunar distances consists in this: that they furnish the navigator with the means of comparing his own time, on board ship, with the time at the Greenwich Observatory. At the moment of observing a distance he notes the time by his own watch or chronometer, and by looking into the Ephemeris he discovers what o'clock it is at Greenwich when the moon and star are in the relative position with regard to each other which he has measured with his sextant. But it will very rarely occur that the navigator's *true distance*, that is, his observed distance cleared from the effects of refraction and lunar parallax, will be found in the Ephemeris. It will prove in most cases to be a quantity lying between two given distances. He is obliged, therefore, to take the difference between his own true distance and the one nearest to it in the pages of the Ephemeris, and to apply to the time standing over the latter a correction proportioned to this difference. This is a case of the simple rule of three. Owing, however, to the various denominations of space and time that enter into the question, it has been found convenient to lessen the labor of the operation by putting between every two successive distances given in the Ephemeris the proportional logarithm of their difference. This proportional logarithm is obtained by subtracting the logarithm of the difference of the two distances from the logarithm of three hours (both quantities being reduced to seconds), because three hours is the interval of time between two successive distances.

On the 1st of March, at midnight, of Greenwich mean time, the distance of the moon's centre from the planet Mars, west of her, is 74° 9′ 21″, and at fifteen hours of the same date it is 75° 52′ 11″; the difference between the two distances is 1° 42′ 50″, or, reduced to seconds, is 6170″, the logarithm of which subtracted from the logarithm of three hours, or 10800, gives for the proportional logarithm of the difference between the two distances, 2431, as it is in the column headed *P. L. of Diff.* If the calculated *true distance* of the navigator lie between the two given distances above mentioned, as, for instance, if it should be 75° 10′ 25″, the corresponding correction of the time would be found as follows: —

| | | ° | ′ | ″ |
|---|---|---|---|---|
| Distance in the Ephemeris at Midnight, | | 74 | 9 | 21 |
| Calculated *True Distance*, | | 75 | 10 | 25 |
| Difference, | | 1 | 1 | 4 |
| Prop. log. in Ephemeris, | 2431 | | | |
| Prop. log. of Difference, 1° 1′ 4″, | 4695 | | | |
| Prop. log. of 1h. 46m. 52s. | 2264; | | | |

and this time is to be added to the time at the head of the column from which the distance of the Ephemeris was taken, which would make the time at Greenwich corresponding to the Navigator's True Distance 1h. 46m. 52s. on the morning of the 2d of March.

This method of getting the Greenwich time between two given times in the Ephemeris rests upon the supposition, that the variation between one distance and the next following is uniform and regular. But owing to the inequalities in the moon's motion, this is not the case; and it is, in consequence of this, necessary to apply to the Greenwich time obtained by the preceding method a small correction.

This correction, due to the second differences in the moon's motion, is given in the Table on page 11 of the Appendix, and is taken out and applied as follows.

The top of the Table is entered with the difference between that proportional logarithm of the Ephemeris which has already been used and the one next following, and the side of the Table is entered with the time which has been added to that at the head of the column of the Ephemeris, that is, the time given by the difference of the proportional logarithms at the close of the preceding paragraph; under the former, and opposite the latter, will be found the correction, in seconds of time, to be added to the time at Greenwich if the proportional logarithms are decreasing, but subtracted if they are increasing.

The calendar pages extend to 217, and the remainder of the Nautical Part, from page 218 to page 241, contains the Ephemeris of the four Planets, Venus, Mars, Jupiter, and Saturn, employed either in lunar distances or in the determination of the latitude or the time. The Ephemeris of the Planets consists of the apparent right ascension at Greenwich mean noon and its variation for one hour, the apparent declination at the same date and its variation for one hour, and the mean time of their meridian passage; and at the bottom of the page will be found the semidiameter and horizontal parallax for every fifth day of the month. The hourly variations belong to noon of the day on which they are given. The mode of correcting by means of the hourly variation for any time from noon has already been explained.

The Solar Coördinates for Greenwich mean noon, which form the basis of the Solar Ephemeris for that date, are added.

## THE ASTRONOMICAL PART.

THIS part is adapted to the meridian of Washington.

*Obliquity of the Ecliptic*, &c., p. 246. — On this page are given the apparent obliquity, the equation of equinoxes in longitude and right ascension, the precession of equinoxes in longitude, and the sun's aberration and horizontal parallax, for every ten days of the year; at the bottom of the page will be found the mean obliquity for the beginning of the year, the precession for the middle of the year, the logarithm of the precession in a sidereal day, and the logarithm of the precession in a solar day. On the same page, the mean longitude of the moon's ascending node is also given for every ten days, and at the bottom of the page its daily motion.

*Fixed Stars.* — The Logarithms $A$, $B$, $C$, $D$, for correcting the places of the Fixed Stars, are given for the mean midnight of every day of the year, and the constants of reduction for every five days. To these tables are added BESSEL'S formulas of reduction, with PETERS' coefficients, and the notation of the catalogue of stars of the British Association.

The *mean* places of 100 principal Fixed Stars on January 1, 1856; the *apparent* places of $\alpha$ and $\delta$ Ursæ Minoris, at the time of the upper transit at Washington, for every day of the year; and the *apparent* places of the remaining principal stars for every ten days; together with a table giving the correction of 51 Cephei, $\sigma$ Octantis, and $\lambda$ Ursæ Minoris, for terms of nutation involving 2 ☾, — complete the subject of the Fixed Stars.

*Solar Ephemeris.* — In the Solar Ephemeris, given for Washington mean and apparent noon, the hourly motions in right ascension and declination are the motions at the instant of noon. Only the seconds of right ascension and declination are given for apparent noon, the degrees and minutes being usually the same as for mean noon. Where the change of a minute occurs, it is indicated by a colon (:).

The *Moon Culminations* and *Moon-culminating Stars* are given in two distinct lists. The list of Moon Culminations contains both the solar and sidereal dates of transit; the apparent right ascension is the right ascension of the limb, and the declination is the declination of the centre, at their respective periods of culmination. The form of the lists of moon-culminating stars has been somewhat changed. In the first volume of the Ephemeris, reference to the stars to be used in connection with the Moon was made by a figure, and the stars themselves were entered successively in the order of numbers. In the present volume these figures are dispensed with, and the proper star to be observed in connection with the transit of the moon's limb is determined by means of the sidereal dates, common to both lists. Each star occupies a separate column containing its right ascension to hundredths of seconds for every sidereal date throughout the year for which it is available, and also its declination and magnitude. The first column of each page contains the sidereal date, and the last the daily change in right ascension of the corresponding stars. It is hoped that the standard observatories will determine the place of each one of these stars once at least in the course of the year. The whole list has been taken from the Twelve-Year Catalogue.

The *Ephemeris of the Moon*, which follows, and the *Moon's Phases*, require no special observation. In the moon's ephemeris, as in that of the sun, the hourly motions belong to the instant for which they are given.

The ephemeris of the two interior planets is given for mean noon and the time of transit; and that of the exterior planets is given for sidereal noon and the time of transit. The place of a planet for any number of minutes $t$, from the nearest noon for which it is given, $t$ being negative when the time precedes the noon, may be computed by the formula,

$$\text{Planet's R. A. (or Dec.)} = A + B\,t + C\,t^2,$$

in which $A$ = R. A. (or Dec.) for the noon,
$B$ = the motion of R. A. (or Dec.) for 1 minute,
or, more exactly, = the factor of $t$, as given in the Ephemeris;
$C$ = the factor of $t^2$ = factor for second differences.

The *Solar Coördinates* are given for each mean noon and midnight, referred to the apparent equinox and equator, and also to the mean equinox and equator, at the beginning of the year. In the case of the rectangular coördinates, only the last four decimals are given for the mean equinox and equator, and the first three places are to be taken from the apparent equinox and equator. When a change of a unit is to be made in the third place, it is indicated by a corresponding colon (:).

The *Planetary Coördinates* are given for days of the Julian Period, in order that they may be a part of a connected series, and therefore more convenient for the continued computation of perturbations.

*Eclipses.* — The *Tables of Data* of the *Solar Eclipses* are adapted to very accurate computation by the following formulas.

$$
\begin{aligned}
\text{Let } \phi &= \text{the latitude of the place,} \\
\lambda &= \text{its western longitude from Washington,} \\
\log e &= 8.9110835, \\
\log (1 - e^2) &= 9.9971066, \\
\sin \phi' &= e \sin \phi, \\
h &= \sec \phi' \cos \phi, \\
k &= (1 - e^2) \sec \phi' \sin \phi, \\
a &= A - h \sin (\mu - \lambda), \\
b &= B - E\,k + G\,h \cos (\mu - \lambda), \\
c &= -C + F\,k - H\,h \cos (\mu - \lambda), \\
m &= \sqrt{b\,c}.
\end{aligned}
$$

If the instant for computation were correctly chosen at the time of beginning or end of the eclipse, $m$ would be exactly equal to $a$. If $m$ is not equal to $a$, the instant for a new computation, which will be an approximation to the actual time of beginning or end, may be found by adding to the preceding time of computation an interval $t$, which may be obtained in seconds by the formulas,

$$
\begin{aligned}
\log \mu' &= 1.86167, \\
\tan \tfrac{1}{2} \psi &= \frac{c}{m} = \frac{m}{b}, \\
a' &= A' - \mu'\,h \cos (\mu - \lambda), \\
b' &= B' - \mu'\,G\,h \sin (\mu - \lambda), \\
t &= \frac{1000000\,(m - a)}{a' + b' \cot \psi};
\end{aligned}
$$

$\psi$ must be taken of the same sign with $a$, and is a sufficiently near approximation to the angle of contact from the north towards the east. For the shadow of a total eclipse, $\psi$ must be taken with a sign opposite that of $a$.

The magnitude of the eclipse is found by taking the difference (with regard to the signs) of $\psi$ at the beginning and end of the eclipse, and if this difference is denoted by $2\,\theta$, the magnitude of the eclipse is

$$24.5 \sin^2 \tfrac{1}{2}\,\theta \text{ or } 24.5 \cos^2 \tfrac{1}{2}\,\theta,$$

accordingly as $\theta$ is acute or obtuse.

The value of $\theta$ may also be obtained by the formulas,

$$
\begin{aligned}
\tan \chi &= \frac{b'}{a'}, \\
\theta &= \psi + \chi,
\end{aligned}
$$

(in which $\chi$ has the sign of $b'$); and the expression of $t$ may be changed to

$$t = 1000000 \,.\, \frac{m-a}{a'} \,.\, \frac{\cos\chi \sin\psi}{\sin\theta}.$$

The following is an example of the computation of the beginning of the Eclipse of April 4, for the Observatory at Paramatta.

| | | | |
|---|---|---|---|
| For Paramatta, $\phi$ | $= -33^{\circ}\ 48'\ 50''$ | $\lambda$ | $= 131^{\circ}\ 55'\ 38''$ |
| $\log \sin\phi$ | $= 9.745463n$ | $\log\cos\phi$ | $= 9.919522$ |
| $\log\sin\phi'$ | $= 8.656546n$ | | |
| $\log\sec\phi'$ | $= 0.000447$ | | $0.000447$ |
| $\log k$ | $= 9.743017n$ | $\log h$ | $= 9.919969$ |

If we assume for the time of beginning $12^{\mathrm{h.}}\ 31^{\mathrm{m.}}$, Washington mean time, we find from the table (p. 392), by interpolating the tabular values for this time,

| | | | |
|---|---|---|---|
| $A$ | $= 0.18823$ | $\log E$ | $= 9.997705$ |
| $B$ | $= -0.26148$ | $\log F$ | $= 9.997267$ |
| $C$ | $= -1.33063$ | $\log G$ | $= 9.011356$ |
| $A'$ | $= 142.11$ | $\log H$ | $= 9.048965$ |
| $B'$ | $= 76.38$ | $\mu$ | $= 187^{\circ}\ 4'\ 0''$ |

Hence

$$\mu - \lambda = 55^{\circ}\ 8'\ 22''$$

| | | | |
|---|---|---|---|
| $\log\cos(\mu-\lambda)$ | 9.757078 | $\log\sin(\mu-\lambda)$ | 9.914103 |
| $\log h\cos(\mu-\lambda)$ | 9.677047 | $\log h\sin(\mu-\lambda)$ | 9.834072 |

| | | | |
|---|---|---|---|
| $\log G h\cos(\mu-\lambda)$ | 8.688403 | $\log H h\cos(\mu-\lambda)$ | 8.726012 |
| $\log E k$ | 9.740722n | $\log F k$ | 9.740284n |
| $G h\cos(\mu-\lambda)$ | 0.04880 | $H h\cos(\mu-\lambda)$ | 0.05321 |
| $E k$ | —0.55045 | $F k$ | —0.54991 |
| $B$ | —0.26148 | $C$ | —1.33063 |
| $b$ | 0.33777 | $c$ | 0.72751 |
| $\log b$ | 9.528621 | $h\sin(\mu-\lambda)$ | 0.68245 |
| $\log c$ | 9.861839 | $A$ | 0.18823 |
| $\log m$ | 9.695230n | $a$ | —0.49422 |
| $\log\tan\frac{1}{2}\psi$ | 10.166609n | $m$ | —0.49571 |
| $\psi$ | 111° 28′ | $m-a$ | —0.00149 |
| $\log\mu' h\cos(\mu-\lambda)$ | 1.53872 | $\log G\mu' h\sin(\mu-\lambda)$ | 0.70710 |
| $\mu' h\cos(\mu-\lambda)$ | 34.57 | $G\mu' h\sin(\mu-\lambda)$ | 5.09 |
| $a'$ | 107.54 | $b'$ | 71.29 |
| $a' + b'\cot\psi$ | 135.57 | $\log b'$ | 1.85303 |
| $\log 10^6(m-a)$ | 3.17319n | $\log\cot\psi$ | 9.59452 |
| $\log(a' + b'\cot\psi)$ | 2.13216 | $b'\cot\psi$ | 28.03 |
| $\log t$ | 1.04103n | | |

| | h. | m. | s. |
|---|---|---|---|
| Assumed time . . . . . . . . . . . . . . . . . | 12 | 31 | 0.0 |
| $t$ . . . . . . . . . . . . . . . . . . . | — | | 11.0 |
| Washington mean time of beginning . . . . . . . . . . | 12 | 30 | 49.0 |
| Difference of longitude in time . . . . . . . . . . . | 8 | 47 | 42.5 |
| Paramatta mean time of beginning . . . . . . . . . . | 3 | 43 | 6.5 |

The corrected values of the assumed time will always be used in making the successive approximations, as long as any shall be thought necessary.

*Occultations.*—The pages 400 to 431 inclusive are taken up with ***Elements for Facilitating the Calculation of Occultations of Planets and Stars by the Moon.*** These elements are given for all the stars, to the sixth magnitude inclusive, contained in the British Association Catalogue, which can be occulted by the moon during the year 1856.

The several columns of these pages contain,—1. the date; 2. the star's name; 3. the star's magnitude; 4. the limiting parallels of visibility; 5. Washington mean time of the moon's true conjunction with the star in right ascension; 6. Washington hour angle, in time, of the star at the time of true conjunction; 7. coördinate $q$ at the time of true conjunction; 8. hourly variation $p'$ of coördinate $p$; 9. hourly variation $q'$ of coördinate $q$; 10. logarithmic sine of the star's declination; 11. logarithmic cosine of the star's declination.

Designating the time of true conjunction by the usual symbol, ☌, we have, at this time, $T =$ ☌, $h = H$, $p = 0$, and $q = Y$. For any other time during the occultation, we shall have $T =$ ☌ $+ (t)$, $h = H +$ sidereal equivalent of $(t)$, $p = (t)\,p'$, and $q = Y + (t)\,q'$. The other elements are considered as constant for the occultation.

In the prediction of an occultation for a particular place, the principal objects of determination are, the instant of *immersion*, or of the star's disappearance behind the moon's limb; of *emersion*, or of the star's reappearance; and the points on the moon's border where these appearances take place.

The calculations are made according to the method of Bessel, whose original paper on the subject may be found in Schumacher's *Astronomische Nachrichten*, Vol. VII. p. 1; also in the *Berliner Astronomisches Jahrbuch* for 1831, p. 257. The letters and numerals prefixed to the stars belonging to the group of the Pleiades, and the magnitudes of these stars, are taken from No. V. of Bessel's *Astronomische Untersuchungen.*

The process of computation is shown by the following equations:—

$d$ = Longitude for Washington, of the place, + West, — East
$\phi$ = Geographical North Latitude of the place.
$\phi'$ = Geocentric North Latitude of the place.
$r$ = Earth's radius at the place, or the distance of the observer's position from the earth's centre.

It is unnecessary to calculate $\phi'$ and $r$ separately, as we have

$$r \sin \phi' = \frac{(1 - e^2) \sin \varphi}{\sqrt{(1 - e^2 \sin^2 \varphi)}} \qquad r \cos \phi' = \frac{\cos \varphi}{\sqrt{(1 - e^2 \sin^2 \varphi)}}$$

in which $e$ denotes the eccentricity of the earth's meridians.

The logarithms of $\frac{1 - e^2}{\sqrt{(1 - e^2 \sin^2 \varphi)}} = \log A$, and of $\frac{1}{\sqrt{(1 - e^2 \sin^2 \varphi)}} = \log B$, derived from $e = .081697$, according to the latest determination of Bessel, may be taken from the following table, where the geographical latitude of the place is the argument.

| $\varphi$ | Log. $A$ | Log. $B$ |
|---|---|---|
| 0 | 9.9971 | 0.0000 |
| 10 | 9.9971 | 0.0000 |
| 20 | 9.9973 | 0.0002 |
| 30 | 9.9975 | 0.0004 |
| 40 | 9.9977 | 0.0006 |
| 50 | 9.9979 | 0.0009 |
| 60 | 9.9982 | 0.0011 |
| 70 | 9.9984 | 0.0013 |

$$r \sin \phi' = A \sin \phi$$
$$r \cos \phi' = B \cos \phi$$

$$a = r\cos\phi'\sin(h-d)$$
$$b = r\cos\phi'\cos(h-d)$$

$$\log\lambda = 9.4192$$

$$u = a \qquad u' = b\lambda$$
$$v = r\sin\phi'\cos D - b\sin D \qquad v' = a\lambda\sin D$$

$$m\sin M = p - u \qquad n\sin N = p' - u'$$
$$m\cos M = q - v \qquad n\cos N = q' - v'$$

$$\log k = 9.4350$$

$$\cos\psi = \frac{m\sin(M-N)}{k}$$

$$Q = 90^\circ - N \mp \psi$$

$$t = -\frac{m}{n}\cos(M-N) \mp \frac{k\sin\psi}{n}$$

Upper signs for Immersion; under signs for Emersion.

$$c\sin C = u + t\,u'$$
$$c\cos C = v + t\,v'$$

$$V = Q + C$$

Mean solar time of the star's apparent contact with the moon's limb

$$= T - d + t$$

Angle from *North Point* $= Q$
Angle from *Vertex* $= V$

The angle $\psi$ is to be taken out positive and less than 180°. If $\log m\sin(M-N)$ be greater than $\log k$, $\cos\psi$ will evidently be greater than 1, or impossible, and there will be no occultation, except in some rare instances where the moon's limb passes very close to the star, when $\log\cos\psi$ will result very near 0. In these cases, a recalculation should be made according to the method which follows, using

$$t = -\frac{m}{n}\cos(M-N),$$

which may give $\log m\sin(M-N)$ less than $\log k$, when the star will be occulted. On the other hand, it may happen that, in these cases of very near approach, a first determination may give a $\cos\psi$ less than 1, which a recalculation will show to be impossible. The angle $\psi$ is then to be considered $= 0^\circ$ when $m\sin(M-N)$ is positive, and we shall have $Q = 90^\circ - N$. When $m\sin(M-N)$ is negative, $\psi = 180^\circ$, or $Q = 90^\circ - N + 180^\circ, = 270^\circ - N$. We shall also have, at the time of nearest approach,

$$\text{star's distance from moon's limb} = \pi\left(m\sin(M-N) - .2723\right),$$

in which $\pi$ is the moon's horizontal parallax.

By *Angle from North Point* is to be understood the arc included between the star when in contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the North Pole; and by *Angle from Vertex*, the arc between the star at contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the zenith. These angles are reckoned from the north point and from the vertex towards the *West* round the circumference of the moon's disc. For the image as seen in an inverting telescope, add to them 180°.

The results obtained by the above equations are only approximate, yet the computed times of immersion and emersion will usually be within one or two minutes of the truth. The error generally increases with the star's distance from the apparent path of the moon's centre, and may, in some cases, amount to several minutes. For an immersion, this error is not of much consequence; but for an emersion, especially of a small star, the time should be determined with greater precision. For this purpose $u'$ and $v'$ must be computed with

$$h' - d = h - d + \tfrac{1}{2}\,\mu,$$

$\mu$ being the symbol by which we express the sidereal equivalent of $t$ in these equations.

$$u' = r \cos \phi' \lambda \cos (h' - d)$$
$$v' = r \cos \phi' \lambda \sin (h' - d) \sin D.$$

Then with these values of $u'$ and $v'$, recompute $N$, $n$, $\psi$, and $t$, by means of

$$n \sin N = p' - u'$$
$$n \cos N = q' - v'$$
$$\cos \psi = \frac{m \sin (M - N)}{k}$$
$$t = -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n}$$

using the $M$ and $m$ obtained by the first computation, and we shall have the time of contact $T - d + t$, generally within a few seconds of the truth.

As a check on the accuracy of the work, we might compute

$$u = r \cos \phi' \sin (h - d + \mu)$$
$$v = r \cos \phi' \cos D - r \cos \phi' \cos (h - d + \mu)$$

and we should have

$$(p + t\,p' - u)^2 + (q + t\,q' - v)^2 = k^2 = 0.0741.$$

But if $m \sin M$, $m \cos M$, $\log n \sin N$, and $\log n \cos N$, have been corrrectly computed, we shall have the following shorter and more convenient check on the subsequent calculations for the time of contact:

$$(m \sin M + t\,n \sin N)^2 + (m \cos M + t\,n \cos N)^2 = k^2 = 0.0741.$$

The elements of computation, $H$, $Y$, etc., are given for the instant of the moon's true conjunction with the star in right ascension. It is desirable, however, in computing an occultation for a particular place, to assume a time for the calculation near to the time of the nearest approach of the moon's centre to the star, as seen at that place, and to reduce the elements to this assumed time. This time, for which the nearest tenth of an hour will be sufficiently accurate, will not differ greatly from the time of *apparent* conjunction, as affected by parallax, which may be determined approximately by the following equations. Let $T - d$ be the time of apparent conjunction; then

$$(t) = \frac{\sin (H - d)}{p' \sec \varphi - [9.4027] \cos (H - d)}$$
$$T - d = \text{☌} - d + (t).$$

The elements corresponding to the time $T - d$ may then be obtained as follows:

$$h - d = H - d + (\mu)$$
$$p = (t)\,p'$$
$$q = Y + (t)\,q'$$

Where occultations are to be generally observed, as at astronomical stations, either temporary or permanent, the observer will find an advantage in looking over the list and selecting, beforehand, all those which may be visible at his station, by observing if his latitude be included between the *limiting parallels* for any given occultation, if the time $(T - d)$ be favorable as regards the absence of daylight, and if the star's hour-angle $(h - d)$ be not greater than its semidiurnal arc for the given latitude.

For obtaining the time

$$T - d = \delta - d + (t),$$

it will be well to tabulate the values of

$$(t) = \frac{\sin (H - d)}{p' \sec \varphi - [9.4027] \cos \overline{H - d}}$$

for every half-hour of $(H - d)$ as far as the greatest semidiurnal arc computed for the latitude of the station with a declination of 30°; and for all values of $p'$, using two decimal figures, from 0.50 to 0.60.

It will also be found advantageous to have tabulated values of

$$u = r \cos \phi' \sin (h - d)$$
$$u' = r \cos \phi' \lambda \cos (h - d)$$

which should be given for every minute (in time) of $(h - d)$, from $0^{h.}$ to $6^{h.}$. If $(h - d)$ exceeds $6^{h.}$, the argument will be $12^{h.} - (h - d)$, instead of $(h - d)$. It will be seen by the equations that $u$ will have the same sign as $\sin (h - d)$, and that $u'$ will have the same sign as $\cos (h - d)$.

In the equation

$$v = r \sin \phi' \cos D - b \sin D$$

the term $r \sin \phi' \cos D$ may be tabulated for every tenth minute of declination, from 0° to 30°.

For a practical application of the preceding formulas, we will make the calculations for an occultation of the star δ Arietis, March 10th, 1856, as it will appear at San Francisco, California, in north latitude, $37° \, 47'.6 = \phi$, and west longitude from Washington, $3^{h.} \, 1^{m.} \, 34^{s.} = d$. The data for the computation are given on page 405, and, with the latitude and longitude of the place, are as follows: —

March 10. δ Arietis, 4½.

| | | | h. m. s. | | |
|---|---|---|---|---|---|
| $\varphi$ | +37° 47'.6 | $H$ | +4 45 0 | $p'$ | 0.5574 |
| | h. m. | | | | |
| $d$ | + 3 1.6 | $d$ | +3 1 34 | $q'$ | +0.2125 |
| $\delta$ | 8 32.8 | $H - d$ | +1 43 26 | log sin $D$ | +9.5166 |
| $\delta - d$ | 5 31.2 | $Y$ | + 0.3367 | log cos $D$ | +9.9552 |

Calculation of the time, $T - d$, and reduction of the elements of computation.

| | | | | | |
|---|---|---|---|---|---|
| | log $p'$ | +9.746 | | | h. |
| | | | | $(t)$ | +0.9 |
| | log sec $\varphi$ | +0.102 | | | h. m. s. |
| log $p'$ sec $\varphi$ = | log (1) | +9.848 | (Reduced to hours and minutes) | $(t)$ | +0 54 |
| | log constant | 9.403 | | $(\mu)$ | +0 54 9 |
| | log cos $(H - d)$ | +9.954 | | $H - d$ | +1 43 26 |
| log [9.403] cos $(H - d)$ = | log (2) | +9.357 | $H - d + (\mu) =$ | $h - d$ | +2 37 35 |
| | (2) | + .228 | | $\delta - d$ | 5 31.2 |
| | (1) | + .705 | $\delta - d + (t) =$ | $T - d$ | 6 25.2 |
| (1) — (2) = | (3) | + .477 | $(t)\, p' = 0.9 \times 0.5574 =$ | $p$ | + .5017 |
| | log (3) | 9.679 | $0.9 \times 0.2125 =$ | $(t)\, q'$ | + .1912 |
| | log sin $(H - d)$ | +9.640 | | $Y$ | + .3367 |
| log $\frac{\sin (H - d)}{(3)}$ = | log $(t)$ | +9.961 | $Y + (t)\, q' =$ | . $\dot{q}$ | + .5279 |

## Calculation of the times of *Immersion* and *Emersion*, etc.

| | | |
|---|---|---|
| (Table, page 492, Arg. $\varphi$) | $\log A$ | 9.9977 |
| | $\log \sin \varphi$ | +9.7873 |
| $\log A \sin \varphi =$ | $\log r \sin \varphi'$ | +9.7850 |
| | $\log \cos D$ | +9.9552 |
| | $\log r \sin \varphi' \cos D$ | +9.7402 |
| (Table, page 492, Arg. $\varphi$) | $\log B$ | 0.0006 |
| | $\log \cos \varphi$ | +9.8977 |
| | $\log r \cos \varphi'$ | +9.8983 |
| | $\log \sin (h - d)$ | +9.8026 |
| $\log r \cos \varphi' \sin (h - d) = \log u = \log a$ | | +9.7009 |
| | $\log \cos (h - d)$ | +9.8880 |
| $\log r \cos \varphi' \cos (h - d) =$ | $\log b$ | +9.7863 |
| | $\log \lambda$ | 9.4192 |
| | $\log a \lambda$ | +9.1201 |
| | $\log \sin D$ | +9.5166 |
| | $\log b \sin D$ | +9.3029 |
| $\log a \lambda \sin D =$ | $\log v'$ | +8.6367 |
| $\log b \lambda =$ | $\log u'$ | +9.2055 |
| | $\log m \sin M$ | —6.6990 |
| | $\log m \cos M$ | +9.2529 |
| | $\log \tan M$ | —7.4461 |
| | $\log \cos M$ | +0.0000 |
| | $\log m$ | +9.2529 |
| | $\log n \sin N$ | +9.5987 |
| | $\log n \cos N$ | +9.2284 |
| | $\log \tan N$ | +0.3703 |
| | $\log \sin N$ | +9.9638 |
| | $\log n$ | +9.6349 |
| | $-\log \frac{m}{n}$ | —9.6180 |
| | $\log \cos (M - N)$ | +9.5904 |
| $-\log \frac{m}{n} \cos (M - N) =$ | $\log (1)$ | —9.2084 |
| | $\log k$ | 9.4350 |
| | $\log \frac{m}{k}$ | +9.8179 |
| | $\log \sin (M - N)$ | —9.9643 |
| $\log \frac{m}{k} \sin (M - N) =$ | $\log \cos \psi$ | —9.7822 |
| | $\log \sin \psi$ | +9.9008 |
| | $\log k \sin \psi$ | +9.3358 |
| $\log \frac{k \sin \psi}{n}$ | $\log (2)$ | +9.7009 |

| | | |
|---|---|---|
| | $r \sin \varphi' \cos D$ | + .5498 |
| | $b \sin D$ | + .2009 |
| $r \sin \varphi' \cos D - b \sin D =$ | $v$ | + .3489 |
| | $q$ | + .5279 |
| $q - v =$ | $m \cos M$ | + .1790 |
| | $p$ | + .5017 |
| | $u$ | + .5022 |
| $p - u =$ | $m \sin M$ | — .0005 |
| | $q'$ | + .2125 |
| | $v'$ | + .0433 |
| $q' - v' =$ | $n \cos N$ | + .1692 |
| | $p'$ | + .5574 |
| | $u'$ | + .1605 |
| $p' - u' =$ | $n \sin N$ | + .3969 |
| | | ° ′ |
| | $M$ | 359 50 |
| | $N$ | 66 55 |
| | $M - N$ | 292 55 |
| | $90° - N$ | 23 5 |
| | $\psi$ | 127 16 |
| For Immersion, $90° - N - \psi =$ | $Q$ | 255 49 |
| | (1) | — .1615 |
| | (2) | + .5022 |
| For Immersion, (1) — (2) = | $t_1$ | — .6637 |
| For Emersion, (1) + (2) = | $t_2$ | + .3407 |
| | $\log t_1$ | —9.8220 |
| | $\log u'$ | +9.2055 |
| | $\log t_1 u'$ | —9.0275 |
| | $\log v'$ | +8.6367 |
| | $\log t_1 v'$ | —8.4587 |
| | $t_1 v'$ | — .0288 |
| $v + t_1 v' =$ | $c \cos C$ | + .3201 |
| | $t_1 u'$ | — .1065 |
| $u + t_1 u' =$ | $c \sin C$ | + .3957 |
| | $\log c \sin C$ | +9.5974 |
| | $\log c \cos C$ | +9.5052 |
| | $\log \tan C$ | +0.0922 |
| | | h. m. |
| | $T - d$ | 6 25.2 |
| (Reduced to hours and minutes) | $t_1 -$ | 0 39.8 |

**Immersion**: *San Francisco Mean Time*, . . . . . . . . . . . . . $T - d + t_1$ 5 45.4

| | | |
|---|---|---|
| | | ° ′ |
| | $C$ | 51 2 |
| Immersion *Angle from North Point* = . . . . . . . . . . . . | $Q$ | 255 49 |
| Immersion *Angle from Vertex* = $Q + C$ = . . . . . . . . . . . | $V$ | 306 51 |
| | | h m. |
| | $t_2 +$ | 0 20.4 |

**Emersion**: *San Francisco Mean Time*, . . . . . . . . . . . . $T - d + t_2$ 6 45.6

### Calculation of a more accurate time, etc., of *Emersion*.

The emersion will take place on the moon's bright limb, and therefore be useless. The recalculation of this phase is merely for the purpose of illustration.

| | | |
|---|---|---|
| | $\log \cos (h'-d)$ | +9.8714 |
| | $\log r \cos \varphi'$ | +9.8983 |
| | $\log \lambda$ | 9.4192 |
| $\log r \cos \varphi' \lambda \cos (h'-d) =$ | $\log u'$ | +9.1889 |
| | $\log \sin (h'-d)$ | +9.8252 |
| | $\log r \cos \varphi' \lambda$ | +9.3175 |
| | $\log \sin D$ | +9.5166 |
| $\log r \cos \varphi' \lambda \sin (h'-d) \sin D =$ | $\log v'$ | +8.6593 |
| | $\log n \sin N$ | +9.6052 |
| | $\log n \cos N$ | +9.2224 |
| | $\log \tan N$ | +0.3828 |
| | $\log \sin N$ | +9.9656 |
| | $\log n$ | +9.6396 |
| | $\log m$ | +9.2529 |
| | $-\log \frac{m}{n}$ | −9.6133 |
| | $\log \cos (M-N)$ | +9.5798 |
| | $\log \sin (M-N)$ | −9.9661 |
| From first determination, | $\log \frac{m}{k}$ | +9.8179 |
| $\log \frac{m}{k} \sin (M-N) =$ | $\log \cos \psi$ | −9.7840 |
| | $\log \sin \psi$ | +9.8998 |
| | $\log k$ | 9.4350 |
| | $\log k \sin \psi$ | +9.3348 |
| $\log \frac{k \sin \psi}{n} =$ | $\log (2)$ | +9.6952 |
| $-\log \frac{m}{n} \cos (M-N) =$ | $\log (1)$ | −9.1931 |
| | (1) | − .1560 |
| | (2) | + .4957 |
| $(1) + (2) =$ | $t$ | + .3397 |

| | | ° ′ |
|---|---|---|
| From first determination, | $M$ | 359 50 |
| | $N$ | 67 30 |
| | $M-N$ | 292 20 |
| | $90° - N$ | 22 30 |
| | $\psi$ | 127 27 |
| For Emersion, $90° - N + \psi =$ | $Q$ | 149 57 |

| | | h. m. s. |
|---|---|---|
| | $h-d$ | +2 37 35 |
| Sid. equiv. for $\frac{1}{2} t_2 =$ | $\frac{1}{2} \mu$ | +0 10 15 |
| $h - d + \frac{1}{2} \mu =$ | $h' - d$ | +2 47 50 |
| | $q'$ | + .2125 |
| | $v'$ | + .0456 |
| $q' - v' =$ | $n \cos N$ | + .1669 |
| | $p'$ | .5574 |
| | $u'$ | + .1545 |
| $p' - u' =$ | $n \sin N$ | + .4029 |
| | $\log t$ | + 9.5311 |
| | $\log n \sin N$ | + 9.6052 |
| | $\log n t \sin N$ | + 9.1363 |
| | $\log n \cos N$ | + 9.2224 |
| | $\log n t \cos N$ | + 8.7535 |
| | $n t \cos N$ | + .0567 |
| From first determination, | $m \cos M$ | + .1790 |
| $m \cos M + n t \cos N =$ | (3) | .2357 |
| | $n t \sin N$ | + .1369 |
| From first determination, | $m \sin M$ | − .0005 |
| $m \sin M + n t \sin N =$ | (4) | .1364 |
| | $(4)^2$ | .0186 |
| | $(3)^2$ | .0556 |
| $(4)^2 + (3)^2 = k^2 = 0.0741$, | Check | .0742 |
| | $\log u'$ | + 9.1889 |
| | $\log t u'$ | + 8.7200 |
| | $\log v'$ | + 8.6593 |
| | $\log t v'$ | + 8.1904 |
| | $t v'$ | + .0155 |
| From first determination, | $v$ | + .3489 |
| $v + t v' =$ | $c \cos C$ | + .3644 |
| | $t u'$ | + .0525 |
| From first determination, | $u$ | + .5022 |
| $u + t u' =$ | $c \sin C$ | + .5547 |
| | $\log c \sin C$ | + 9.7441 |
| | $\log c \cos C$ | + 9.5616 |
| | $\log \tan C$ | + 0.1825 |

| | | h. m. |
|---|---|---|
| | $T-d$ | 6 25.2 |
| (Reduced to hours and minutes), | $t$ | + 0 20.4 |
| EMERSION: *San Francisco Mean Time*, . . . . . . . . . . . . | $T-d+t$ | 6 45.6 |

| | | ° ′ |
|---|---|---|
| | $C$ | 56 42 |
| Emersion *Angle from North Point* = . . . . . . . . . . . | $Q$ | 149 57 |
| Emersion *Angle from Vertex* = $Q + C$ = . . . . . . . . . . . | $V$ | 206 39 |

The last two pages of the Occultations contain a list of such Occultations as will be visible at Washington, during the year 1856.

The Tables of *Jupiter's Satellites* embrace, —

A list of the occultations, eclipses, transits, and transits of shadows, in the order of the time of the occurrence of the phenomena for the satellites taken promiscuously. They are given for every month, accompanied with a diagram, constructed for the eclipse which occurs nearest the middle of the month, showing the phases of the eclipses for an inverting telescope.

A table containing the mean time of the geocentric superior conjunction, and the rectangular coördinates of the satellites corresponding to the time from the next preceding superior conjunction, at intervals of twenty minutes for the first satellite, of forty minutes for the second, of one hour and twenty minutes for the third, and of three hours for the fourth satellite. They are also given for the time of eclipse for the first, second, and third satellites at intervals of seven days, and for the fourth for every eclipse. They enable the astronomer to obtain the configurations at all times. They are given in seconds of arc.

The coördinates have their origin in the centre of the primary, and are referred to the major and minor axes of the apparent ellipse described by the path of the satellite.

The major axis of this ellipse is constant, for the earth's mean place; but the minor axis takes all values from the positive and negative maxima to zero, owing to the changes in the earth's elevation above the plane of the satellite's orbit.

The values in the table correspond to the maximum value of the conjugate axis, as seen from the sun or that of the mean maximum for the earth (which is a constant value). Factors are given in an adjoining column, at intervals of seven days for the first, second, and third satellites, and seventeen days for the fourth, to reduce the above values to those corresponding to the axis for the time being; also for the same intervals, the angle of inclination of the northern semi-minor axis to the circle of declination.

$x$ is positive after superior conjunction, or on the east side of the planet, negative before superior conjunction, or on the west side. $y$ will be positive north, negative south. The eclipses, occultations, &c. of the satellites, visible at Washington, that is, those which occur when the sun is 8° below and Jupiter 8° above the horizon, are distinguished by a W. placed after the name of the phase.

The *Appendix* contains an article on the construction of this work, similar to that of the preceding year. It will be seen that the elements of the orbit of Saturn have been somewhat modified by PEIRCE; that PETERS' formula for the ephemeris of Sirius, embracing its oscillations in Right Ascension, has been adopted; and that a table of corrections is given to be applied to the Moon's Horizontal Parallax to make it conform to ADAMS' tables.

It also contains tables of reduction from the equator to the ecliptic, and the reverse; a general table for the Libration of the Moon, constructed by means of the formulas on page 330, and furnishing the values to be employed in the computation of the moon's libration in latitude and longitude (see page 330); a table showing the moon's mean motion in longitude for sidereal intervals of time, carried out to tenths of minutes; the table showing the correction required on occount of second differences in the moon's motion, the use of which is explained in the preceding part of this article, page 487; a convenient table of logarithms of small arcs in space or time, and a table for converting mean solar into sidereal time, and the reverse.

An improved method of finding the error and rate of a chronometer by equal altitudes, prepared by Professor CHAUVENET, and the Ephemeris of Neptune for the year 1854, are also given in the Appendix.

# APPENDIX.

# CONSTRUCTION OF THE ASTRONOMICAL AND NAUTICAL EPHEMERIDES FOR 1856.

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The Precession of the Equinoxes adopted in this volume is taken from Struve and Peters;[*] it is,

$$\text{Precession} = 50''.2411 + 0''.0002268\,t,$$

in which $t$ is the number of years after 1800.

The Mean Obliquity of the Ecliptic is also taken from Struve and Peters, and its value is,[†]

$$\text{Obliquity} = 23^\circ\ 27'\ 54''.22 - 0''.4645\,t - 0''.0000014\,t^2.$$

The constant of aberration is that of Struve, and is,[‡]

$$\text{Aberration} = 20''.4451 \pm 0''.0111.$$

The Nutation of the Apparent Obliquity and the Equation of the Equinoxes are computed from Peters' formulas given in his *Numerus Constans Nutationis.*[§] These formulas are reprinted in the volume of this ephemeris for 1855.

The Mean Places of the Fixed Stars are taken from the list of stars in the *English Nautical Almanac* for 1855, combined with that given in the *Astronomical Observations made during the Year* 1846 *at the National Observatory, Washington.*

The Apparent Places of the Fixed Stars have been obtained by means of a set of tables constructed and printed in the office of this work, from the transformation of Peters' formulas,[‖] which are given in the *Construction of the Almanac for* 1855.

The place of Sirius is corrected by the following formula, given by Peters, for the variability of its motion in right ascension compared with those of $\beta$ Orionis, $\alpha$ Orionis, and Procyon.

$$\text{Variation of right ascension} = 0^s.101 + 0^s.00072\,t + 0^s.170\ \text{sin.}\ (u + 92^\circ\ 18');$$

in which

---

[*] Peters' *Numerus Constans Nutationis*, p. 71.

[†] Ibid., pp. 66 and 71.

[‡] Struve's *Constant de l'Aberration*, p. 47.

[§] Peters' *Numerus Constans Nutationis*, pp. 46-48.

[‖] Ibid., pp. 73, 74.

$u$ = the eccentric anomaly from the inferior apsis. It is found from the elements,

Mean annual motion of Sirius in its orbit = 7°.3104 ± 0°.2162
Period of its revolution = $49^{y}.245$ ± $1^{y}.456$
Passage through the inferior apsis = 1792.819 ± $2^{y}.039$
Eccentricity = 0.5647 ± 0.0827.

The List of Moon-culminating Stars is enlarged, and so arranged in a more systematic form as to permit the observer a greater range for selection.

The Ephemeris of the Sun is constructed from CARLINI's tables with BESSEL's improvements. In the computation of the Sun's Geocentric Coördinates, regard has been had to the sun's latitude; the computation has been made by means of the formulas given in the *Construction of the Almanac for* 1855.

ENCKE's discussion of the Transits of Venus in 1761 and 1769, in his *Der Venusdurchgang von* 1769, &c., has furnished the standard

Equatorial Horizontal Parallax at the Earth's Mean Distance = 8″.5776.

The Sun's Semidiameter at the Earth's Mean Distance has been taken equal to 16′ 2″.

For reducing observations of different observers, the following corrections may be added: —

| | | s. |
|---|---|---|
| For Greenwich Mural Circle, | H. | + 0.21 |
| " " " " | H. B. | — 0.43 |
| " " " " | F. | — 0.86 |
| " " " " | E. | + 0.17 |
| " " " " | R. | — 0.57 |
| " " " " | G. | — 0.18 |
| " " " " | I. H. | — 0.87 |
| " " " " | D. | — 0.61 |
| " " " " | W. R. | + 0.49 |
| " " " " | P. | — 1.28 |
| Königsberg Meridian Circle, | Bessel | — 1.10 |
| Dorpat " " | W. Struve | — 1.36 |
| Washington Mural Circle, | Prof. Coffin | + 1.00 |
| " " " | Lieut. Page | + 1.00 |
| Washington Meridian Circle, | Prof. Hubbard | — 0.41 |

The Ephemeris of the Moon has been constructed from *The Tables of the Moon* constructed and printed for the use of the Nautical Almanac.

The Parallax of the Moon given by ADAMS' Tables is more reliable than that which is given in the Moon Tables, and will probably be adopted in the next volume of this Ephemeris. A table is given in the Appendix, by which the parallaxes for the years 1855 and 1856 may be referred to ADAMS' Tables.

The Semidiameter of the Moon at the Earth's Mean Distance is taken to be $\frac{1}{500}$ part greater than that given by BURCKHARDT, although that given by BURCKHARDT is probably better adapted to the computation of eclipses and occultations.

# CONSTRUCTION OF THE ALMANAC.

The Ephemeris of Mercury has been constructed from the theory of Le Verrier, published in the *Additions* to the *Connaissance des Temps* for 1848, without any alteration. Manuscript Tables have been computed from Le Verrier's formulas for this purpose, by Professor Winlock.

The Ephemeris of Venus has been derived from manuscript Tables, constructed from Lindenau's Tables, in a form similar to that adopted for the Lunar Tables; applying Airy's Long Equation and the corrections proceeding from the discussion, by the method of Least Squares, of Mr. Hugh Breen's results contained in his paper on the *Corrections of* Lindenau's *Elements of the Orbit of Venus*, &c., published in the *Memoirs of the Royal Astronomical Society*, Vol. XVIII.; and adopting the secular variations of the elements from Le Verrier's *Memoir on the Determination of the Secular Inequalities of the Planets*, which appeared in the *Connaissance des Temps* for the year 1844.

The following are the corresponding corrections of the elements for 1856: —

corr. mean long. for Jan. 1, 1856 = —1″.4
corr. mean motion = —0″.052
corr. eccentricity = +0.00003774
corr. long. of per. = +413.2
corr. long. of node = +73.7
corr. inclination = +2″.3.

The Ephemeris of Mars is derived from manuscript Tables constructed from Lindenau's Tables in the same manner as the Tables of Venus. Mr. Hugh Breen's results contained in his paper *On the Corrections of* Lindenau's *Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX., have also been discussed and applied; and Le Verrier's secular variations of the elements are likewise adopted.

The following are the corresponding corrections of the elements for 1856: —

corr. mean distance = —0.000004531
corr. mean motion = +0″.04795
corr. mean long. for Jan. 1, 1856 = +4″.88
corr. eccentricity = +0.000005700
corr. long. of per. = +6″.99
corr. long. of node = +204″.5
corr. inclination = —4″.0.

The Ephemeris of Jupiter is derived from manuscript Tables constructed from Bouvard's Tables, with such changes as were required to make them correspond more nearly to the formulas.

The Ephemeris of Saturn is also derived from manuscript Tables constructed from the Tables of Bouvard, with changes having the same object. The mass of Jupiter given by Bessel has been adopted and used.

This mass $= \frac{1}{1047.879 \pm 0.235}$ of the sun's mass.

The following corrections of the elements have also been introduced for 1856: —

corr. mean long. for Jan. 1, 1856 = +4″.9
corr. long. of node = —143″.4
corr. inclination = —5″.7.

The Ephemeris of Uranus is derived from the elliptical portion of **Bouvard's** Tables, with Le Verrier's corrections and perturbations caused by Jupiter and Saturn, contained in his *Recherches sur les Mouvements de la Planète Herschel (dite Uranus)*, published in the *Connaissance des Temps* for 1849, and also Peirce's corrections and perturbations arising from the influence of Neptune.

The combined corrections of the elements deduced by Peirce for January 1, 1800, are as follows: —

corr. mean distance = +0.000942
corr. mean motion = —1.″13560
corr. eccentricity = —0.0003626
corr. long. of per. = +8252″.4
corr. long. of epoch = +2575.″4.

The Ephemeris of Neptune is derived from Peirce's theory and Walker's orbit.

The eclipses and elongations of Jupiter's Satellites are computed from Damoiseau's Tables.

The vertical semidiameters of the Planets are computed from the following values: —

| | Vertical Semidiameter. | Log. Dist. | Authority |
|---|---|---|---|
| Mercury | ″ 3.34 | 0.00 | Le Verrier, *Theory of Mercury.* |
| Venus | 8.546 ± ″ 0.086 | 0.00 | Peirce, from the Washington Observations of 1845 and 1846, made with the mural circle. |
| Mars | 2.842 ± 0.057 | 0.25 | |
| Jupiter | 18.78 ± 0.067 | 0.70 | |
| Saturn | 8.77 ± 0.039 | 0.95 | |
| Uranus | 1.68 ± 0.3 | 1.30 | |

To correspond to the apparent semidiameters observed with the Washington mural circle, all the semidiameters, except those of Mercury, computed from these values, must be increased by a constant quantity = 0″.57.

The apparent elements of Saturn's Rings are computed from Bessel's data, except those for Bond's dusky ring.

The elements of the eclipse are adapted to the neat and simple modification of Bessel's formulas, suggested by T. Henry Safford, Jr.

The elements adapted to Bessel's formulas are given for all occultations of stars greater than those of the sixth magnitude.

The Heliocentric Coördinates of the Planets are given for the computation of perturbations, and the following are the values of the masses, that of the Sun being unity: —

| | | |
|---|---|---|
| Mercury | $\frac{1}{4865751}$ | Encke, *A. N.*, No. 443. |
| Venus | $\frac{1}{390000}$ | Le Verrier, *Théor. de Merc.*, p. 115. |

| | | |
|---|---|---|
| The Earth | $\frac{1}{354936}$ | Le Verrier, *Théor. de Merc.*, p. 26. |
| Mars | $\frac{1}{2680637}$ | Burckhardt, *Conn. des Temps*, 1816, p. 343. |
| Jupiter | $\frac{1}{1047.879 \pm 0.235}$ | Bessel, *Der Masse des Jupiter*, p. 64. |
| Saturn | $\frac{1}{3501.6}$ | Bessel, *Comptes Rendus*, 1841. |
| Uranus | $\frac{1}{24905}$ | Lamont, *Mem. Ast. Soc.*, Vol. XI. p. 54. |
| Neptune | $\frac{1}{18780}$ | Peirce, *Am. Ac. Proc.*, Vol. I. p. 333. |

The intervals of original computation have in all cases been made sufficiently small to authorize the use of the differences as a check of the accuracy of the work. The results have also been tested, in various portions, by means of duplicate computations. The proofs from the stereotype plates have been thoroughly examined by an independent series of differences. And it is believed that, in every respect, that system has been adopted in which accuracy was most likely to be secured.

The principal computations of the Ephemeris have been distributed in the following manner.

The Sun has been computed by Professor Winlock. The Moon, with the Culminations and Lunar Distances, has been divided between Mr. Runkle, Professor Van Vleck, Professor Hedrick, Mr. Kerr, and Mr. Wright. Mercury has been computed by Professor Winlock, Venus by Miss Mitchell, Mars by Mr. Bradford, Jupiter by Professor Kendall, Saturn by Mr. Runkle, Uranus by Professor Peirce, and Neptune by Professor Kendall. The Fixed Stars have been computed by Mr. Sprague, the General Constants for Reduction by Professor Peirce, and the Occultations by Mr. Downes. The eclipses have been computed by Mr. Wright and Mr. Kerr. The Table of Geographical Positions of the Principal Observatories has been prepared by Dr. B. A. Gould. The Table of General Geographical Positions has been prepared by Mr. Oliver.

# CORRECTIONS

To be applied to Moon's Horizontal Parallax to make it conform to Adams' Tables.

## GREENWICH MEAN NOON. 1855.

| Day of Month. | Jan. | Feb. | March. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| d. | ″ | ″ | ″ | ″ | ″ | ″ | ″ | ″ | ″ | ″ | ″ | ″ |
| 1 | —1.5 | —3.1 | —2.2 | —0.6 | +0.8 | +1.6 | +1.4 | —0.2 | —2.3 | —2.6 | —3.3 | —1.3 |
| 2 | 1.7 | 3.4 | 2.2 | 0.6 | 0.8 | 1.2 | 0.9 | 1.1 | 2.9 | 2.9 | 3.3 | 0.9 |
| 3 | 2.4 | 3.4 | 2.2 | 0.8 | 0.4 | 0.8 | +0.2 | 1.9 | 3.6 | 3.2 | 3.1 | —0.5 |
| 4 | 2.9 | 3.9 | 2.6 | 1.0 | 0.2 | 0.3 | —0.5 | 2.6 | 3.9 | 3.7 | 2.4 | +0.1 |
| 5 | 3.3 | 4.0 | 2.8 | 1.6 | +0.0 | +0.1 | 1.0 | 3.0 | 4.1 | 3.5 | 1.7 | 0.5 |
| 6 | 3.5 | 3.8 | 2.7 | 1.1 | —0.2 | —0.1 | 1.6 | 3.6 | 4.0 | 3.3 | 1.1 | 0.7 |
| 7 | 3.6 | 3.3 | 2.5 | 0.8 | +0.2 | 0.2 | 1.8 | 3.8 | 3.8 | 2.8 | —0.4 | 1.4 |
| 8 | 3.3 | 2.6 | 2.2 | —0.2 | 0.5 | 0.4 | 2.1 | 3.8 | 3.3 | 2.0 | +0.5 | 2.1 |
| 9 | 3.3 | 2.0 | 1.8 | +0.5 | 0.8 | 0.6 | 2.4 | 3.8 | 2.8 | 1.2 | 1.0 | 2.2 |
| 10 | 3.0 | 1.5 | 1.1 | 1.1 | 0.8 | 0.7 | 2.5 | 3.4 | 2.3 | —0.4 | 1.5 | 2.2 |
| 11 | 2.5 | 1.2 | —0.4 | 1.3 | 0.7 | 0.9 | 2.5 | 3.1 | 1.8 | +0.4 | 1.6 | 1.5 |
| 12 | 2.2 | 0.8 | +0.0 | 1.3 | 0.6 | 1.2 | 2.5 | 3.0 | 1.2 | 0.7 | 1.4 | +0.6 |
| 13 | 1.8 | —0.2 | 0.4 | 1.4 | 0.5 | 1.5 | 2.6 | 2.7 | 0.6 | 0.8 | 0.8 | —0.5 |
| 14 | 1.2 | +0.4 | 0.8 | 1.2 | +0.3 | 2.0 | 2.9 | 2.4 | —0.2 | 0.9 | +0.3 | 0.8 |
| 15 | —0.4 | 1.1 | 1.2 | 1.2 | —0.0 | 2.4 | 2.9 | 2.0 | +0.1 | 0.9 | —0.2 | 1.1 |
| 16 | +0.5 | 1.7 | 1.3 | 0.8 | 0.6 | 2.7 | 3.0 | 1.7 | 0.3 | 0.8 | 0.6 | 1.7 |
| 17 | 1.1 | 1.8 | 1.5 | +0.4 | 1.2 | 3.0 | 2.9 | 1.3 | 0.5 | 0.7 | 0.9 | 2.1 |
| 18 | 1.3 | 1.2 | 1.6 | —0.3 | 1.9 | 3.0 | 2.6 | 0.8 | 0.5 | 0.4 | 1.4 | 2.3 |
| 19 | 1.2 | +0.5 | +0.9 | 1.0 | 2.5 | 3.0 | 2.0 | 0.4 | 0.4 | +0.1 | 1.7 | 2.6 |
| 20 | 0.7 | —0.4 | —0.5 | 1.9 | 2.8 | 2.7 | 1.8 | 0.4 | 0.1 | —0.5 | 2.2 | 3.0 |
| 21 | +0.1 | 1.2 | 0.4 | 2.4 | 2.8 | 2.4 | 1.5 | 0.0 | +0.1 | 1.0 | 2.4 | 3.1 |
| 22 | —0.4 | 1.9 | 1.2 | 2.7 | 2.7 | 2.1 | 0.9 | —0.1 | —0.2 | 1.4 | 2.3 | 2.5 |
| 23 | 1.0 | 2.4 | 1.8 | 2.7 | 2.3 | 1.5 | 0.4 | +0.3 | 0.1 | 1.3 | 2.2 | 2.0 |
| 24 | 1.3 | 2.8 | 1.9 | 2.5 | 2.0 | 1.0 | —0.1 | 0.6 | 0.0 | 1.3 | 1.7 | 1.5 |
| 25 | 1.5 | 2.8 | 2.1 | 2.2 | 1.6 | —0.2 | +0.4 | 0.9 | 0.0 | 1.0 | 1.3 | 1.4 |
| 26 | 1.7 | 2.7 | 2.5 | 1.8 | 1.1 | +0.6 | 1.1 | 1.3 | 0.1 | 1.1 | 0.8 | 1.2 |
| 27 | 1.8 | 2.5 | 2.5 | 1.2 | —0.3 | 1.0 | 1.8 | 1.3 | 0.5 | 1.3 | 0.9 | 0.6 |
| 28 | 2.2 | 2.5 | 2.1 | 0.7 | +0.5 | 1.9 | 1.9 | 0.7 | 0.9 | 1.5 | 1.3 | 0.9 |
| 29 | 2.3 | 2.2 | 1.7 | —0.1 | 1.5 | 2.4 | 2.1 | +0.0 | 1.4 | 1.7 | 1.2 | 0.5 |
| 30 | 2.6 | 2.2 | 1.4 | +0.4 | 1.9 | 2.1 | 1.6 | —0.7 | 1.9 | 2.4 | 1.4 | —0.0 |
| 31 | —2.8 | —2.2 | —1.1 | +0.8 | +1.9 | +1.4 | +0.7 | —1.6 | —2.6 | —2.7 | —1.3 | +0.8 |

## GREENWICH MEAN NOON. 1856.

| Day of Month. | Jan. | Feb. | March. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | +0.3 | +1.1 | +0.4 | —1.3 | —2.4 | —2.5 | —1.9 | +0.0 | +1.1 | +0.9 | +0.6 | —2.1 |
| 2 | 0.8 | 1.1 | +0.1 | 1.6 | 2.3 | 2.1 | 1.3 | 0.5 | 1.2 | 0.7 | 1.4 | 3.0 |
| 3 | 1.3 | 1.1 | —0.1 | 1.5 | 2.3 | 1.7 | 0.7 | 0.7 | 1.1 | +0.2 | 2.0 | 3.3 |
| 4 | 1.8 | 0.9 | 0.4 | 1.8 | 2.3 | 1.4 | 0.3 | 0.9 | 0.8 | —0.4 | 2.7 | 3.8 |
| 5 | 2.1 | +0.6 | 0.6 | 2.1 | 2.3 | 1.3 | —0.2 | 1.0 | 0.4 | 1.0 | 2.9 | 4.0 |
| 6 | 2.1 | —0.1 | 1.1 | 2.5 | 2.4 | 1.2 | +0.1 | 1.1 | +0.0 | 1.6 | 3.5 | 4.1 |
| 7 | 1.7 | 1.1 | 2.7 | 3.1 | 2.4 | 1.1 | 0.4 | 1.0 | —0.4 | 2.3 | 4.1 | 4.1 |
| 8 | 1.1 | 2.2 | 3.7 | 3.5 | 2.5 | 0.8 | 0.7 | 0.7 | 0.9 | 3.0 | 4.4 | 3.6 |
| 9 | +0.1 | 3.2 | 4.2 | 3.6 | 2.4 | —0.3 | 0.9 | 0.4 | 1.2 | 3.2 | 4.0 | 3.0 |
| 10 | —0.9 | 3.9 | 4.6 | 3.6 | 2.0 | +0.2 | 1.1 | 0.2 | 1.4 | 3.4 | 3.4 | 2.1 |
| 11 | 1.9 | 4.2 | 4.6 | 3.3 | 1.5 | 0.7 | 1.1 | 0.2 | 1.7 | 3.2 | 2.7 | 1.0 |
| 12 | 2.6 | 4.3 | 4.2 | 2.7 | 0.7 | 1.2 | 1.1 | 0.2 | 1.8 | 2.9 | 2.0 | —0.3 |
| 13 | 2.9 | 4.1 | 3.7 | 2.2 | —0.1 | 1.4 | 1.1 | 0.1 | 1.8 | 2.5 | 1.5 | +0.4 |
| 14 | 3.2 | 4.0 | 3.2 | 1.5 | +0.6 | 1.7 | 1.2 | +0.0 | 1.9 | 2.5 | 1.1 | 1.0 |
| 15 | 3.6 | 3.7 | 2.7 | 0.8 | 1.1 | 2.0 | 1.3 | —0.4 | 2.3 | 2.5 | 0.8 | 1.0 |
| 16 | 3.7 | 3.4 | 2.0 | —0.1 | 1.4 | 2.1 | 1.3 | 0.9 | 3.0 | 2.5 | 0.4 | 1.0 |
| 17 | 3.8 | 3.0 | 1.4 | +0.5 | 1.9 | 1.9 | 0.7 | 1.7 | 3.2 | 2.1 | 0.1 | 1.1 |
| 18 | 3.7 | 2.5 | 0.8 | 0.8 | 2.1 | 1.4 | +0.0 | 2.5 | 3.5 | 1.9 | 0.1 | 0.9 |
| 19 | 3.1 | 2.0 | 0.5 | 1.1 | 2.0 | +0.7 | —1.0 | 3.1 | 3.9 | 1.8 | 0.1 | 0.9 |
| 20 | 2.6 | 1.8 | 0.4 | 1.2 | 1.7 | —0.2 | 1.8 | 3.6 | 3.3 | 1.6 | 0.1 | 0.9 |
| 21 | 2.3 | 1.4 | 0.1 | 1.0 | 0.9 | 1.3 | 2.6 | 3.9 | 3.1 | 1.5 | 0.0 | 0.8 |
| 22 | 2.0 | 1.2 | 0.0 | 0.8 | +0.1 | 2.2 | 3.2 | 4.0 | 2.6 | 1.3 | 0.1 | 0.8 |
| 23 | 1.7 | 1.1 | 0.2 | +0.2 | —0.8 | 2.6 | 3.6 | 4.0 | 2.3 | 1.1 | 0.2 | 0.7 |
| 24 | 1.7 | 0.8 | 0.3 | —0.4 | 1.4 | 3.0 | 3.9 | 3.8 | 2.0 | 0.8 | 0.3 | 0.5 |
| 25 | 1.4 | 0.6 | 0.3 | 0.7 | 2.0 | 3.4 | 4.0 | 3.5 | 1.3 | 0.5 | 0.4 | 0.4 |
| 26 | 1.1 | 0.3 | 0.3 | 1.1 | 2.2 | 3.7 | 4.1 | 2.9 | 0.9 | —0.1 | 0.4 | +0.2 |
| 27 | 0.7 | —0.0 | 0.3 | 1.3 | 2.6 | 3.8 | 3.9 | 2.1 | —0.3 | +0.2 | +0.3 | —0.5 |
| 28 | —0.4 | +0.3 | 0.3 | 1.6 | 2.8 | 3.7 | 3.4 | 1.2 | +0.3 | 0.5 | —0.2 | 1.2 |
| 29 | +0.4 | 0.4 | 0.5 | 2.0 | 3.0 | 3.4 | 2.5 | —0.3 | 0.8 | 0.5 | 0.7 | 2.1 |
| 30 | 0.8 | 0.4 | 0.7 | 2.2 | 3.2 | 2.7 | 1.5 | +0.4 | 0.9 | 0.5 | 1.4 | 3.0 |
| 31 | +1.1 | +0.4 | —1.1 | —2.4 | —3.0 | —1.9 | —0.7 | +0.9 | +0.9 | +0.6 | —2.1 | —3.6 |

# EQUATOR TO ECLIPTIC.

## TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.

| *k* | *k* | *A* | *a* | Diff. | Log. *a* | Diff. | *b* | Log. *b* | *B* | Diff. | *k* | *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | h. m. | ° ′ | | | | | | | ° ′ | | h. m. | ° |
| 0 | 0 0 | 0 0.0 | 0.3981 | 1 | 9.6000 | 1 | 0.9173 | 9.9625 | 0 0.0 | 26.0 | 12 0 | 180 |
| 1 | 0 4 | 0 5.4 | 0.3980 | 2 | 9.5999 | 2 | 0.9174 | 9.9626 | 0 26.0 | 26.1 | 11 56 | 179 |
| 2 | 0 8 | 0 10.8 | 0.3978 | 3 | 9.5997 | 3 | 0.9175 | 9.9626 | 0 52.1 | 26.0 | 11 52 | 178 |
| 3 | 0 12 | 0 16.2 | 0.3975 | 4 | 9.5994 | 5 | 0.9176 | 9.9627 | 1 18.1 | 25.9 | 11 48 | 177 |
| 4 | 0 16 | 0 21.5 | 0.3971 | 5 | 9.5989 | 6 | 0.9178 | 9.9627 | 1 44.0 | 25.9 | 11 44 | 176 |
| 5 | 0 20 | 0 26.9 | 0.3966 | 7 | 9.5988 | 7 | 0.9180 | 9.9628 | 2 9.9 | 25.9 | 11 40 | 175 |
| 6 | 0 24 | 0 32.2 | 0.3959 | 8 | 9.5976 | 9 | 0.9183 | 9.9630 | 2 35.8 | 25.8 | 11 36 | 174 |
| 7 | 0 28 | 0 37.4 | 0.3951 | 9 | 9.5967 | 10 | 0.9186 | 9.9631 | 3 1.6 | 25.8 | 11 32 | 173 |
| 8 | 0 32 | 0 42.6 | 0.3942 | 10 | 9.5957 | 11 | 0.9190 | 9.9633 | 3 27.4 | 25.6 | 11 28 | 172 |
| 9 | 0 36 | 0 47.7 | 0.3932 | 13 | 9.5946 | 13 | 0.9195 | 9.9635 | 3 53.0 | 25.6 | 11 24 | 171 |
| 10 | 0 40 | 0 52.8 | 0.3920 | 13 | 9.5933 | 14 | 0.9200 | 9.9638 | 4 18.6 | 25.4 | 11 20 | 170 |
| 11 | 0 44 | 0 57.8 | 0.3907 | 13 | 9.5919 | 15 | 0.9205 | 9.9640 | 4 44.0 | 25.3 | 11 16 | 169 |
| 12 | 0 48 | 1 2.7 | 0.3894 | 15 | 9.5904 | 17 | 0.9211 | 9.9643 | 5 9.3 | 25.2 | 11 12 | 168 |
| 13 | 0 52 | 1 7.5 | 0.3879 | 16 | 9.5887 | 18 | 0.9217 | 9.9646 | 5 34.5 | 25.1 | 11 8 | 167 |
| 14 | 0 56 | 1 12.8 | 0.3863 | 17 | 9.5869 | 20 | 0.9224 | 9.9649 | 5 59.6 | 24.9 | 11 4 | 166 |
| 15 | 1 0 | 1 17.0 | 0.3846 | 19 | 9.5849 | 21 | 0.9231 | 9.9652 | 6 24.5 | 24.8 | 11 0 | 165 |
| 16 | 1 4 | 1 21.5 | 0.3827 | 20 | 9.5828 | 22 | 0.9239 | 9.9656 | 6 49.3 | 24.6 | 10 56 | 164 |
| 17 | 1 8 | 1 25.9 | 0.3807 | 21 | 9.5806 | 24 | 0.9247 | 9.9660 | 7 13.9 | 24.4 | 10 52 | 163 |
| 18 | 1 12 | 1 30.2 | 0.3786 | 22 | 9.5782 | 25 | 0.9256 | 9.9664 | 7 38.3 | 24.2 | 10 48 | 162 |
| 19 | 1 16 | 1 34.4 | 0.3764 | 23 | 9.5757 | 27 | 0.9265 | 9.9668 | 8 2.5 | 24.0 | 10 44 | 161 |
| 20 | 1 20 | 1 38.5 | 0.3741 | 24 | 9.5730 | 29 | 0.9274 | 9.9673 | 8 26.5 | 23.9 | 10 40 | 160 |
| 21 | 1 24 | 1 42.4 | 0.3717 | 26 | 9.5701 | 30 | 0.9284 | 9.9677 | 8 50.4 | 23.6 | 10 36 | 159 |
| 22 | 1 28 | 1 46.2 | 0.3691 | 27 | 9.5671 | 31 | 0.9294 | 9.9682 | 9 14.0 | 23.4 | 10 32 | 158 |
| 23 | 1 32 | 1 49.9 | 0.3664 | 27 | 9.5640 | 33 | 0.9304 | 9.9687 | 9 37.4 | 23.2 | 10 28 | 157 |
| 24 | 1 36 | 1 53.4 | 0.3637 | 29 | 9.5607 | 35 | 0.9315 | 9.9692 | 10 0.6 | 22.9 | 10 24 | 156 |
| 25 | 1 40 | 1 56.7 | 0.3608 | 30 | 9.5572 | 36 | 0.9326 | 9.9697 | 10 23.5 | 22.7 | 10 20 | 155 |
| 26 | 1 44 | 1 59.9 | 0.3578 | 31 | 9.5536 | 38 | 0.9338 | 9.9703 | 10 46.2 | 22.5 | 10 16 | 154 |
| 27 | 1 48 | 2 2.9 | 0.3547 | 32 | 9.5498 | 39 | 0.9350 | 9.9708 | 11 8.7 | 22.2 | 10 12 | 153 |
| 28 | 1 52 | 2 5.8 | 0.3515 | 33 | 9.5459 | 41 | 0.9362 | 9.9714 | 11 30.9 | 21.9 | 10 8 | 152 |
| 29 | 1 56 | 2 8.5 | 0.3482 | 34 | 9.5418 | 43 | 0.9374 | 9.9719 | 11 52.8 | 21.7 | 10 4 | 151 |
| 30 | 2 0 | 2 11.1 | 0.3448 | 35 | 9.5375 | 45 | 0.9387 | 9.9725 | 12 14.5 | 21.4 | 10 0 | 150 |
| 31 | 2 4 | 2 13.5 | 0.3413 | 37 | 9.5330 | 46 | 0.9400 | 9.9731 | 12 35.9 | 21.1 | 9 56 | 149 |
| 32 | 2 8 | 2 15.7 | 0.3376 | 38 | 9.5284 | 48 | 0.9413 | 9.9737 | 12 57.0 | 20.8 | 9 52 | 148 |
| 33 | 2 12 | 2 17.7 | 0.3338 | 38 | 9.5236 | 51 | 0.9426 | 9.9743 | 13 17.8 | 20.6 | 9 48 | 147 |
| 34 | 2 16 | 2 19.6 | 0.3300 | 39 | 9.5185 | 52 | 0.9440 | 9.9750 | 13 38.4 | 20.2 | 9 44 | 146 |
| 35 | 2 20 | 2 21.3 | 0.3261 | 40 | 9.5133 | 54 | 0.9453 | 9.9756 | 13 58.6 | 20.0 | 9 40 | 145 |
| 36 | 2 24 | 2 22.8 | 0.3221 | 41 | 9.5079 | 56 | 0.9467 | 9.9762 | 14 18.6 | 19.6 | 9 36 | 144 |
| 37 | 2 28 | 2 24.1 | 0.3180 | 43 | 9.5023 | 58 | 0.9481 | 9.9768 | 14 38.2 | 19.3 | 9 32 | 143 |
| 38 | 2 32 | 2 25.2 | 0.3137 | 44 | 9.4965 | 60 | 0.9495 | 9.9775 | 14 57.5 | 19.0 | 9 28 | 142 |
| 39 | 2 36 | 2 26.2 | 0.3093 | 44 | 9.4905 | 63 | 0.9509 | 9.9781 | 15 16.5 | 18.6 | 9 29 | 141 |
| 40 | 2 40 | 2 27.0 | 0.3049 | 45 | 9.4842 | 65 | 0.9524 | 9.9788 | 15 35.1 | 18.4 | 9 20 | 140 |
| 41 | 2 44 | 2 27.6 | 0.3004 | 46 | 9.4777 | 67 | 0.9538 | 9.9794 | 15 53.5 | 18.0 | 9 16 | 139 |
| 42 | 2 48 | 2 28.0 | 0.2958 | 47 | 9.4710 | 69 | 0.9552 | 9.9801 | 16 11.5 | 17.7 | 9 12 | 138 |
| 43 | 2 52 | 2 28.2 | 0.2911 | 47 | 9.4641 | 72 | 0.9566 | 9.9807 | 16 29.2 | 17.3 | 9 8 | 137 |
| 44 | 2 56 | 2 28.2 | 0.2864 | 49 | 9.4569 | 74 | 0.9581 | 9.9814 | 16 46.5 | 17.0 | 9 4 | 136 |
| 45 | 3 0 | 2 28.1 | 0.2815 | 50 | 9.4495 | 78 | 0.9595 | 9.9820 | 17 3.5 | 16.7 | 9 0 | 135 |
| 46 | 3 4 | 2 27.8 | 0.2765 | 50 | 9.4417 | 80 | 0.9610 | 9.9827 | 17 20.2 | 16.3 | 8 56 | 134 |
| 47 | 3 8 | 2 27.3 | 0.2715 | 51 | 9.4337 | 82 | 0.9625 | 9.9834 | 17 36.5 | 15.9 | 8 52 | 133 |
| 48 | 3 12 | 2 26.6 | 0.2664 | 52 | 9.4255 | 86 | 0.9639 | 9.9840 | 17 52.4 | 15.6 | 8 48 | 132 |
| 49 | 3 16 | 2 25.8 | 0.2612 | 53 | 9.4169 | 89 | 0.9653 | 9.9847 | 18 8.0 | 15.3 | 8 44 | 131 |
| 50 | 3 20 | 2 24.8 | 0.2559 | 54 | 9.4080 | 92 | 0.9667 | 9.9853 | 18 23.3 | 14.9 | 8 40 | 130 |
| 51 | 3 24 | 2 23.6 | 0.2505 | 54 | 9.3988 | 95 | 0.9681 | 9.9859 | 18 38.2 | 14.5 | 8 36 | 129 |
| 52 | 3 28 | 2 22.2 | 0.2451 | 55 | 9.3893 | 99 | 0.9695 | 9.9865 | 18 52.7 | 14.2 | 8 32 | 128 |
| 53 | 3 32 | 2 20.7 | 0.2396 | 56 | 9.3794 | 102 | 0.9709 | 9.9872 | 19 6.9 | 13.8 | 8 28 | 127 |
| 54 | 3 36 | 2 19.0 | 0.2340 | 57 | 9.3692 | 106 | 0.9722 | 9.9878 | 19 20.7 | 13.4 | 8 24 | 126 |
| 55 | 3 40 | 2 17.1 | 0.2283 | 57 | 9.3586 | 111 | 0.9736 | 9.9884 | 19 34.1 | 13.1 | 8 20 | 125 |

# EQUATOR TO ECLIPTIC.

## TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.

| *k* | *k* | *A* | *a* | Diff. | Log. *a* | Diff. | *b* | Log. *b* | *B* | Diff. | *k* | *k* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | h. m. | ° ′ | | | | | | | ° ′ | | h. m. | ° |
| 56 | 3 44 | 2 15.1 | 0.2226 | 58 | 9.3475 | 114 | 0.9749 | 9.9890 | 19 47.2 | 12.7 | 8 16 | 124 |
| 57 | 3 48 | 2 13.0 | 0.2168 | 59 | 9.3361 | 119 | 0.9762 | 9.9895 | 19 59.9 | 12.3 | 8 11 | 123 |
| 58 | 3 52 | 2 10.7 | 0.2109 | 59 | 9.3242 | 124 | 0.9775 | 9.9901 | 20 12.2 | 12.0 | 8 8 | 122 |
| 59 | 3 56 | 2 8.2 | 0.2050 | 60 | 9.3118 | 129 | 0.9788 | 9.9907 | 20 24.2 | 11.6 | 8 4 | 121 |
| 60 | 4 0 | 2 5.6 | 0.1990 | 60 | 9.2989 | 134 | 0.9800 | 9.9912 | 20 35.8 | 11.2 | 8 0 | 120 |
| 61 | 4 4 | 2 2.8 | 0.1930 | 61 | 9.2855 | 139 | 0.9812 | 9.9918 | 20 47.0 | 10.9 | 7 56 | 119 |
| 62 | 4 8 | 1 59.9 | 0.1896 | 62 | 9.2716 | 146 | 0.9824 | 9.9923 | 20 57.9 | 10.4 | 7 52 | 118 |
| 63 | 4 12 | 1 56.9 | 0.1807 | 62 | 9.2570 | 152 | 0.9836 | 9.9928 | 21 8.3 | 10.1 | 7 48 | 117 |
| 64 | 4 16 | 1 53.7 | 0.1745 | 63 | 9.2418 | 159 | 0.9847 | 9.9933 | 21 18.4 | 9.7 | 7 44 | 116 |
| 65 | 4 20 | 1 50.4 | 0.1682 | 63 | 9.2259 | 166 | 0.9858 | 9.9938 | 21 28.1 | 9.4 | 7 40 | 115 |
| 66 | 4 24 | 1 47.0 | 0.1619 | 64 | 9.2093 | 175 | 0.9868 | 9.9942 | 21 37.5 | 8.9 | 7 36 | 114 |
| 67 | 4 28 | 1 43.5 | 0.1555 | 64 | 9.1918 | 183 | 0.9878 | 9.9947 | 21 46.4 | 8.6 | 7 32 | 113 |
| 68 | 4 32 | 1 39.8 | 0.1491 | 64 | 9.1735 | 192 | 0.9888 | 9.9951 | 21 55.0 | 8.2 | 7 28 | 112 |
| 69 | 4 36 | 1 36.1 | 0.1427 | 65 | 9.1543 | 203 | 0.9898 | 9.9955 | 22 3.2 | 7.9 | 7 24 | 111 |
| 70 | 4 40 | 1 32.2 | 0.1362 | 66 | 9.1340 | 214 | 0.9907 | 9.9959 | 22 11.1 | 7.4 | 7 20 | 110 |
| 71 | 4 44 | 1 28.2 | 0.1296 | 66 | 9.1126 | 227 | 0.9916 | 9.9963 | 22 18.5 | 7.1 | 7 16 | 109 |
| 72 | 4 48 | 1 24.2 | 0.1230 | 66 | 9.0899 | 240 | 0.9924 | 9.9967 | 22 25.6 | 6.7 | 7 12 | 108 |
| 73 | 4 52 | 1 20.0 | 0.1164 | 67 | 9.0659 | 256 | 0.9932 | 9.9970 | 22 32.3 | 6.3 | 7 8 | 107 |
| 74 | 4 56 | 1 15.7 | 0.1097 | 67 | 9.0403 | 273 | 0.9940 | 9.9974 | 22 38.6 | 5.9 | 7 4 | 106 |
| 75 | 5 0 | 1 11.4 | 0.1030 | 67 | 9.0130 | 294 | 0.9947 | 9.9977 | 22 44.5 | 5.6 | 7 0 | 105 |
| 76 | 5 4 | 1 7.0 | 0.0963 | 67 | 8.9836 | 315 | 0.9954 | 9.9980 | 22 50.1 | 5.1 | 6 56 | 104 |
| 77 | 5 8 | 1 2.5 | 0.0896 | 68 | 8.9521 | 342 | 0.9960 | 9.9982 | 22 55.2 | 4.8 | 6 52 | 103 |
| 78 | 5 12 | 0 58.0 | 0.0828 | 68 | 8.9179 | 373 | 0.9966 | 9.9985 | 23 0.0 | 4.4 | 6 48 | 102 |
| 79 | 5 16 | 0 53.4 | 0.0760 | 69 | 8.8806 | 410 | 0.9971 | 9.9987 | 23 4.4 | 4.0 | 6 41 | 101 |
| 80 | 5 20 | 0 48.7 | 0.0696 | 68 | 8.8396 | 453 | 0.9976 | 9.9990 | 23 8.4 | 3.6 | 6 40 | 100 |
| 81 | 5 24 | 0 44.0 | 0.0623 | 69 | 8.7943 | 508 | 0.9981 | 9.9992 | 23 12.0 | 3.3 | 6 36 | 99 |
| 82 | 5 28 | 0 39.2 | 0.0554 | 69 | 8.7435 | 576 | 0.9985 | 9.9993 | 23 15.3 | 2.8 | 6 32 | 98 |
| 83 | 5 32 | 0 34.4 | 0.0485 | 69 | 8.6859 | 667 | 0.9988 | 9.9995 | 23 18.1 | 2.5 | 6 28 | 97 |
| 84 | 5 36 | 0 29.6 | 0.0416 | 69 | 8.6192 | 789 | 0.9991 | 9.9996 | 23 20.6 | 2.1 | 6 24 | 96 |
| 85 | 5 40 | 0 24.7 | 0.0347 | 69 | 8.5403 | 967 | 0.9994 | 9.9997 | 23 22.7 | 1.7 | 6 20 | 95 |
| 86 | 5 44 | 0 19.8 | 0.0278 | 69 | 8.4436 | 1248 | 0.9996 | 9.9998 | 23 24.4 | 1.3 | 6 16 | 94 |
| 87 | 5 48 | 0 14.9 | 0.0209 | 70 | 8.3188 | 1760 | 0.9998 | 9.9999 | 23 25.7 | 1.0 | 6 12 | 93 |
| 88 | 5 52 | 0 9.9 | 0.0139 | 69 | 8.1428 | 3010 | 0.9999 | 0.0000 | 23 26.7 | 0.6 | 6 8 | 92 |
| 89 | 5 56 | 0 5.0 | 0.0070 | 70 | 7.8418 | | 1.0000 | 0.0000 | 23 27.3 | 0.2 | 6 4 | 91 |
| 90 | 6 0 | 0 0.0 | 0.0000 | | | | 1.0000 | 0.0000 | 23 27.5 | | 6 0 | 90 |

This table is computed for an obliquity of 23° 27′ 30.

The argument $k$ is either the longitude or the right ascension, or their excess above 180° or $12^{h.}$

Right ascension ($\alpha$) and declination ($\delta$) are converted into longitude ($\lambda$) and latitude ($\beta$) by the formulæ

$k = \alpha$ or $= \alpha - 12^{h.}$ | in which the sign of $a$ is that of cos. $\alpha$
$\tan. p = a \tan. (\delta - B)$ | the sign of $B$ is that of sin. $\alpha$
$\tan. \beta = b \tan. (\delta - B) \cos. p$ | the sign of $A$ is that of tan. $\alpha$
$\lambda = \alpha + A + p$

Longitude ($\lambda$) and latitude ($\beta$) are converted into right ascension and declination by the formulæ

$k = \lambda = \quad = \lambda - 180^{\circ}$ | in which the sign of $a$ is that of cos. $\lambda$
$\tan. g = a \tan. (\beta + B)$ | the sign of $B$ is that of sin. $\lambda$
$\tan. \delta = b \tan. (\beta + B) \cos. g$ | the sign of $A$ is thot of tan. $\lambda$
$\alpha = \lambda + a - g$

The following approximate formulæ can be be used when $\beta$ is less than 10°.

$$\beta = b\ (\delta - B)$$

$$\lambda = \alpha + A + a\ (\delta - B) \sec. \beta$$

and the factor sec. $\beta$ can be neglected when $\beta$ is less than 4°.

# MOON'S LIBRATION, 1855.

## TABLE FOR THE LIBRATION OF THE MOON.

| ☊ — λ | Δ λ | *a* | *B* | ☊ — λ | ☊ — λ | Δ λ | *a* | *B* | ☊ — λ |
|---|---|---|---|---|---|---|---|---|---|
| ° | | | ° ′ | ° | ° | ′ | | ° ′ | ° |
| 0 | 0.0 | 39 | 0 0.0 | 180 | 46 | 0.6 | 56 | 1 3.9 | 134 |
| 1 | 0.0 | 39 | 0 1.6 | 179 | 47 | 0.6 | 57 | 1 4.9 | 133 |
| 2 | 0.0 | 39 | 0 3.1 | 178 | 48 | 0.6 | 58 | 1 6.0 | 132 |
| 3 | 0.1 | 39 | 0 4.7 | 177 | 49 | 0.6 | 59 | 1 7.0 | 131 |
| 4 | 0.1 | 39 | 0 6.2 | 176 | 50 | 0.6 | 60 | 1 8.0 | 130 |
| 5 | 0.1 | 39 | 0 7.7 | 175 | 51 | 0.6 | 62 | 1 9.0 | 129 |
| 6 | 0.2 | 39 | 0 9.3 | 174 | 52 | 0.6 | 63 | 1 10.0 | 128 |
| 7 | 0.2 | 39 | 0 10.8 | 173 | 53 | 0.5 | 64 | 1 10.9 | 127 |
| 8 | 0.2 | 39 | 0 12.4 | 172 | 54 | 0.5 | 66 | 1 11.8 | 126 |
| 9 | 0.2 | 39 | 0 13.9 | 171 | 55 | 0.5 | 67 | 1 12.7 | 125 |
| 10 | 0.2 | 39 | 0 15.4 | 170 | 56 | 0.5 | 69 | 1 13.6 | 124 |
| 11 | 0.3 | 39 | 0 16.9 | 169 | 57 | 0.5 | 71 | 1 14.5 | 123 |
| 12 | 0.3 | 40 | 0 18.5 | 168 | 58 | 0.5 | 73 | 1 15 3 | 122 |
| 13 | 0.3 | 40 | 0 20.0 | 167 | 59 | 0.5 | 75 | 1 16.1 | 121 |
| 14 | 0.3 | 40 | 0 21.5 | 166 | 60 | 0.5 | 77 | 1 16.9 | 120 |
| 15 | 0.3 | 40 | 0 23.0 | 165 | 61 | 0.5 | 80 | 1 17.6 | 119 |
| 16 | 0.3 | 40 | 0 24.5 | 164 | 62 | 0.5 | 83 | 1 18.4 | 118 |
| 17 | 0.3 | 40 | 0 26.0 | 163 | 63 | 0.5 | 86 | 1 19.1 | 117 |
| 18 | 0.3 | 41 | 0 27.4 | 162 | 64 | 0.5 | 89 | 1 19.8 | 116 |
| 19 | 0.4 | 41 | 0 28.9 | 161 | 65 | 0.4 | 92 | 1 20.4 | 115 |
| 20 | 0.4 | 41 | 0 30.4 | 160 | 66 | 0.4 | 95 | 1 21.1 | 114 |
| 21 | 0.4 | 41 | 0 31.8 | 159 | 67 | 0.4 | 99 | 1 21.7 | 113 |
| 22 | 0.4 | 42 | 0 33.2 | 158 | 68 | 0.4 | 103 | 1 22.3 | 112 |
| 23 | 0.4 | 42 | 0 34.7 | 157 | 69 | 0.4 | 108 | 1 22.9 | 111 |
| 24 | 0.4 | 42 | 0 36.1 | 156 | 70 | 0 4 | 113 | 1 23.4 | 110 |
| 25 | 0.4 | 43 | 0 37.5 | 155 | 71 | 0.4 | 119 | 1 23.9 | 109 |
| 26 | 0.5 | 43 | 0 38.9 | 154 | 72 | 0.4 | 125 | 1 24.4 | 108 |
| 27 | 0.5 | 43 | 0 40.3 | 153 | 73 | 0.4 | 132 | 1 24.9 | 107 |
| 28 | 0.5 | 44 | 0 41.7 | 152 | 74 | 0.3 | 141 | 1 25.3 | 106 |
| 29 | 0.5 | 44 | 0 43.1 | 151 | 75 | 0.3 | 150 | 1 25.7 | 105 |
| 30 | 0.5 | 45 | 0 44.4 | 150 | 76 | 0.3 | 160 | 1 26.1 | 104 |
| 31 | 0.5 | 45 | 0 45.7 | 149 | 77 | 0.3 | 172 | 1 26.5 | 103 |
| 32 | 0.5 | 46 | 0 47.0 | 148 | 78 | 0.2 | 186 | 1 26.8 | 102 |
| 33 | 0.5 | 46 | 0 48.4 | 147 | 79 | 0.2 | 202 | 1 27.1 | 101 |
| 34 | 0.5 | 47 | 0 49.7 | 146 | 80 | 0.2 | 222 | 1 27.4 | 100 |
| 35 | 0.5 | 47 | 0 51.0 | 145 | 81 | 0.2 | 247 | 1 27.7 | 99 |
| 36 | 0.5 | 48 | 0 52.2 | 144 | 82 | 0.2 | 278 | 1 27.9 | 98 |
| 37 | 0.5 | 48 | 0 53.4 | 143 | 83 | 0.1 | 318 | 1 28.1 | 97 |
| 38 | 0.6 | 49 | 0 54.7 | 142 | 84 | 0.1 | 370 | 1 28.3 | 96 |
| 39 | 0.6 | 50 | 0 55.9 | 141 | 85 | 0.1 | 440 | 1 28.5 | 95 |
| 40 | 0.6 | 50 | 0 57.1 | 140 | 86 | 0.1 | 555 | 1 28.6 | 94 |
| 41 | 0.6 | 51 | 0 58.3 | 139 | 87 | 0.1 | 740 | 1 28.7 | 93 |
| 42 | 0.6 | 52 | 0 59.4 | 138 | 88 | 0.0 | 1110 | 1 28.7 | 92 |
| 43 | 0.6 | 53 | 1 0.6 | 137 | 89 | 0.0 | 2220 | 1 28.8 | 91 |
| 44 | 0.6 | 54 | 1 1.7 | 136 | 90 | 0.0 | ∞ | 1 28.8 | 90 |
| 45 | 0.6 | 55 | 1 2.8 | 135 | | | | | |

**Δλ has the sign of tan. (☊ — λ)**
***a* has the sign of cos. (☊ — λ)**
***B* has the sign of sin. (☊ — λ)**

**When ☊ — λ exceeds 180° the table is to be entered with (☊ — λ) — 180° as the argument in the column ☊ — λ.**

# MOON'S MEAN MOTION, 1855.

## MOON'S MEAN MOTION IN LONGITUDE FOR SIDEREAL INTERVALS.

| Day. | ☾'s Motion in Longitude. | Minutes. | ☾'s Motion in Longitude. | Minutes. | ☾'s Motion in Longitude. |
|---|---|---|---|---|---|
| | ° ′ | | ′ | 30 | ′<br>16.4 |
| 1 | 13 8.4 | 1 | 0.5 | 31 | 17.0 |
| 2 | 26 16.9 | 2 | 1.1 | 32 | 17.5 |
| 3 | 39 25.3 | 3 | 1.6 | 33 | 18.1 |
| 4 | 52 33.7 | 4 | 2.2 | 34 | 18.6 |
| 5 | 65 42.1 | 5 | 2.7 | 35 | 19.2 |
| 6 | 78 50.6 | 6 | 3.3 | 36 | 19.7 |
| 7 | 91 59.0 | 7 | 3.8 | 37 | 20.3 |
| 8 | 105 7.4 | 8 | 4.4 | 38 | 20.8 |
| 9 | 118 15.8 | 9 | 4.9 | 39 | 21.4 |
| 10 | 131 24.3 | 10 | 5.5 | 40 | 21.9 |
| Hour. | | 11 | 6.0 | 41 | 22.4 |
| | | 12 | 6.6 | 42 | 23.0 |
| 1 | 0 32.9 | 13 | 7.1 | 43 | 23.5 |
| 2 | 1 5.7 | 14 | 7.7 | 44 | 24.1 |
| 3 | 1 38.6 | 15 | 8.2 | 45 | 24.6 |
| 4 | 2 11.3 | 16 | 8.8 | 46 | 25.2 |
| 5 | 2 44.3 | 17 | 9.3 | 47 | 25.7 |
| 6 | 3 17.1 | 18 | 9.9 | 48 | 26.3 |
| 7 | 3 50.0 | 19 | 10.4 | 49 | 26.8 |
| 8 | 4 22.8 | 20 | 11.0 | 50 | 27.4 |
| 9 | 4 55.7 | 21 | 11.5 | 51 | 27.9 |
| 10 | 5 28.5 | 22 | 12.0 | 52 | 28.5 |
| 11 | 6 1.4 | 23 | 12.5 | 53 | 29.0 |
| 12 | 6 34.2 | 24 | 13.1 | 54 | 29.6 |
| 13 | 7 7.1 | 25 | 13.6 | 55 | 30.1 |
| 14 | 7 39.9 | 26 | 14.2 | 56 | 30.7 |
| 15 | 8 12.8 | 27 | 14.7 | 57 | 31.2 |
| 16 | 8 45.6 | 28 | 15.3 | 58 | 31.8 |
| 17 | 9 18.5 | 29 | 15.9 | 59 | 32.3 |
| 18 | 9 51.3 | 30 | 16.4 | 60 | 32.9 |
| | | | | Seconds. | ′ |
| 19 | 10 24.2 | | | 10 | 0.1 |
| 20 | 10 57.0 | | | 20 | 0.2 |
| 21 | 11 29.9 | | | 30 | 0.3 |
| 22 | 12 2.7 | | | 40 | 0.4 |
| 23 | 12 35.6 | | | 50 | 0.5 |
| 24 | 13 8.4 | | | 60 | 0.5 |

# TABLE I.

## TABLE, SHOWING THE CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING TO A CORRECTED LUNAR DISTANCE.

| Approximate Interval. | | Difference of the Proportional Logarithms in the Ephemeris. | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 |
| h. m. | h. m. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. |
| 0 0 | 3 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 10 | 2 50 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 0 20 | 2 40 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| 0 30 | 2 30 | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 9 |
| 0 40 | 2 20 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 10 | 11 | 11 |
| 0 50 | 2 10 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 12 | 13 | 13 |
| 1 0 | 2 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 12 | 13 | 13 | 14 | 14 |
| 1 10 | 1 50 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 15 |
| 1 20 | 1 40 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 15 | 16 |
| 1 30 | 1 30 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 12 | 13 | 14 | 14 | 15 | 16 | 16 |

| | | Difference of the Proportional Logarithms in the Ephemeris. | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 | 102 |
| h. m. | h. m. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. |
| 0 0 | 3 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 10 | 2 50 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 |
| 0 20 | 2 40 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 11 | 11 | 11 | 11 | 12 | 12 | 12 | 12 | 13 |
| 0 30 | 2 30 | 9 | 10 | 10 | 10 | 11 | 11 | 12 | 12 | 12 | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 15 | 15 | 16 | 16 | 16 | 17 | 17 | 17 | 18 |
| 0 40 | 2 20 | 12 | 12 | 13 | 13 | 13 | 14 | 14 | 15 | 15 | 16 | 16 | 16 | 17 | 17 | 18 | 18 | 19 | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 22 |
| 0 50 | 2 10 | 14 | 14 | 15 | 15 | 16 | 16 | 16 | 17 | 17 | 18 | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 26 |
| 1 0 | 2 0 | 15 | 16 | 16 | 17 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 |
| 1 10 | 1 50 | 16 | 17 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 |
| 1 20 | 1 40 | 17 | 17 | 18 | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | 29 | 30 | 31 | 31 |
| 1 30 | 1 30 | 17 | 18 | 18 | 19 | 19 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 31 | 31 | 32 |

| | | Difference of the Proportional Logarithms in the Ephemeris. | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 104 | 106 | 108 | 110 | 112 | 114 | 116 | 118 | 120 | 122 | 124 | 126 | 128 | 130 | 132 | 134 | 136 | 138 |
| h. m. | h. m. | s. | s. | s. | s | s. | s. | s | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. | s. |
| 0 0 | 3 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 10 | 2 50 | 7 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 9 |
| 0 20 | 2 40 | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 16 | 16 | 17 | 17 |
| 0 30 | 2 30 | 18 | 18 | 19 | 19 | 19 | 20 | 20 | 20 | 21 | 21 | 21 | 22 | 22 | 22 | 23 | 23 | 24 | 24 |
| 0 40 | 2 20 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 28 | 29 | 29 | 30 |
| 0 50 | 2 10 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 32 | 33 | 33 | 34 | 34 |
| 1 0 | 2 0 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 33 | 33 | 34 | 34 | 35 | 35 | 36 | 37 | 37 | 38 | 38 |
| 1 10 | 1 50 | 31 | 31 | 32 | 32 | 33 | 34 | 34 | 35 | 35 | 36 | 37 | 37 | 38 | 38 | 39 | 40 | 40 | 41 |
| 1 20 | 1 40 | 32 | 33 | 33 | 34 | 34 | 35 | 35 | 36 | 37 | 38 | 38 | 39 | 39 | 40 | 41 | 41 | 42 | 42 |
| 1 30 | 1 30 | 32 | 33 | 34 | 34 | 35 | 35 | 36 | 36 | 37 | 38 | 39 | 39 | 40 | 40 | 41 | 42 | 42 | 43 |

The Correction is to be *added* to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are *decreasing*, and *subtracted* when they are *increasing*.

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° 0h. | 0′ 0m. | 0″ 0s. | | 0.0000 | 0.3010 | 0.4771 | 0.6021 | 0.6990 | 0.7782 | 0.8451 | 0.9031 | 0.9542 |
| | 0 | 10 | 1.0000 | 1.0414 | 1.0792 | 1.1139 | 1.1461 | 1.1761 | 1.2041 | 1.2304 | 1.2553 | 1.2788 |
| | 0 | 20 | 1.3010 | 1.3222 | 1.3424 | 1.3617 | 1.3802 | 1.3979 | 1.4150 | 1.4314 | 1.4472 | 1.4624 |
| | 0 | 30 | 1.4771 | 1.4914 | 1.5051 | 1.5185 | 1.5315 | 1.5441 | 1.5563 | 1.5682 | 1.5798 | 1.5911 |
| | 0 | 40 | 1.6021 | 1.6128 | 1.6232 | 1.6335 | 1.6435 | 1.6532 | 1.6628 | 1.6721 | 1.6812 | 1.6902 |
| | 0 | 50 | 1.6990 | 1.7076 | 1.7160 | 1.7243 | 1.7324 | 1.7404 | 1.7482 | 1.7559 | 1.7634 | 1.7709 |
| 0 | 1 | 0 | 1.7782 | 1.7853 | 1.7924 | 1.7993 | 1.8062 | 1.8129 | 1.8195 | 1.8261 | 1.8325 | 1.8388 |
| | 1 | 10 | 1.8451 | 1.8513 | 1.8573 | 1.8633 | 1.8692 | 1.8751 | 1.8808 | 1.8865 | 1.8921 | 1.8976 |
| | 1 | 20 | 1.9031 | 1.9085 | 1.9138 | 1.9191 | 1.9243 | 1.9294 | 1.9345 | 1.9395 | 1.9445 | 1.9494 |
| | 1 | 30 | 1.9542 | 1.9589 | 1.9638 | 1.9685 | 1.9731 | 1.9777 | 1.9823 | 1.9868 | 1.9912 | 1.9956 |
| | 1 | 40 | 2.0000 | 2.0043 | 2.0086 | 2.0128 | 2.0170 | 2.0212 | 2.0253 | 2.0294 | 2.0334 | 2.0374 |
| | 1 | 50 | 2.0414 | 2.0453 | 2.0492 | 2.0531 | 2.0569 | 2.0607 | 2.0645 | 2.0682 | 2.0719 | 2.0755 |
| 0 | 2 | 0 | 2.0792 | 2.0828 | 2.0864 | 2.0899 | 2.0934 | 2.0969 | 2.1004 | 2.1038 | 2.1072 | 2.1106 |
| | 2 | 10 | 2.1139 | 2.1173 | 2.1206 | 2.1239 | 2.1271 | 2.1303 | 2.1335 | 2.1367 | 2.1399 | 2.1430 |
| | 2 | 20 | 2.1461 | 2.1492 | 2.1523 | 2.1553 | 2.1584 | 2.1614 | 2.1644 | 2.1673 | 2.1703 | 2.1732 |
| | 2 | 30 | 2.1761 | 2.1790 | 2.1818 | 2.1847 | 2.1875 | 2.1903 | 2.1931 | 2.1959 | 2.1987 | 2.2014 |
| | 2 | 40 | 2.2041 | 2.2068 | 2.2095 | 2.2122 | 2.2148 | 2.2175 | 2.2201 | 2.2227 | 2.2253 | 2.2279 |
| | 2 | 50 | 2.2304 | 2.2330 | 2.2355 | 2.2380 | 2.2405 | 2.2430 | 2.2455 | 2.2480 | 2.2504 | 2.2529 |
| 0 | 3 | 0 | 2.2553 | 2.2577 | 2.2601 | 2.2625 | 2.2648 | 2.2672 | 2.2695 | 2.2718 | 2.2742 | 2.2765 |
| | 3 | 10 | 2.2788 | 2.2810 | 2.2833 | 2.2856 | 2.2878 | 2.2900 | 2.2923 | 2.2945 | 2.2967 | 2.2989 |
| | 3 | 20 | 2.3010 | 2.3032 | 2.3054 | 2.3075 | 2.3096 | 2.3118 | 2.3139 | 2.3160 | 2.3181 | 2.3201 |
| | 3 | 30 | 2.3222 | 2.3243 | 2.3263 | 2.3284 | 2.3304 | 2.3324 | 2.3345 | 2.3365 | 2.3385 | 2.3404 |
| | 3 | 40 | 2.3424 | 2.3444 | 2.3464 | 2.3483 | 2.3502 | 2.3522 | 2.3541 | 2.3560 | 2.3579 | 2.3598 |
| | 3 | 50 | 2 3617 | 2.3636 | 2.3655 | 2.3674 | 2.3692 | 2.3711 | 2.3729 | 2.3747 | 2.3766 | 2.3784 |
| 0 | 4 | 0 | 2.3802 | 2.3820 | 2.3838 | 2.3856 | 2.3874 | 2.3892 | 2.3909 | 2.3927 | 2.3945 | 2.3962 |
| | 4 | 10 | 2.3979 | 2.3997 | 2.4014 | 2.4031 | 2.4048 | 2.4065 | 2.4082 | 2.4099 | 2.4116 | 2.4133 |
| | 4 | 20 | 2.4150 | 2.4166 | 2.4183 | 2.4200 | 2.4216 | 2.4232 | 2.4249 | 2.4265 | 2.4281 | 2.4298 |
| | 4 | 30 | 2.4314 | 2.4330 | 2.4346 | 2.4362 | 2.4378 | 2.4393 | 2.4409 | 2.4425 | 2.4440 | 2.4456 |
| | 4 | 40 | 2.4472 | 2.4487 | 2.4502 | 2.4518 | 2.4533 | 2.4548 | 2.4564 | 2.4579 | 2.4594 | 2.4609 |
| | 4 | 50 | 2.4624 | 2.4639 | 2.4654 | 2.4669 | 2.4683 | 2.4698 | 2.4713 | 2.4728 | 2.4742 | 2.4757 |
| 0 | 5 | 0 | 2.4771 | 2.4786 | 2.4800 | 2.4814 | 2.4829 | 2.4843 | 2.4857 | 2.4871 | 2.4886 | 2.4900 |
| | 5 | 10 | 2.4914 | 2.4928 | 2.4942 | 2.4955 | 2.4969 | 2.4983 | 2.4997 | 2.5011 | 2.5024 | 2.5038 |
| | 5 | 20 | 2.5051 | 2.5065 | 2.5079 | 2.5092 | 2.5105 | 2.5119 | 2.5132 | 2.5145 | 2.5159 | 2.5172 |
| | 5 | 30 | 2.5185 | 2.5198 | 2.5211 | 2.5224 | 2.5237 | 2.5250 | 2.5263 | 2.5276 | 2.5289 | 2.5302 |
| | 5 | 40 | 2.5315 | 2.5328 | 2.5340 | 2.5353 | 2.5366 | 2.5378 | 2.5391 | 2 5403 | 2.5416 | 2.5428 |
| | 5 | 50 | 2.5441 | 2.5453 | 2.5465 | 2.5478 | 2.5490 | 2.5502 | 2.5514 | 2.5527 | 2.5539 | 2.5551 |
| 0 | 6 | 0 | 2.5563 | 2.5575 | 2.5587 | 2.5599 | 2.5611 | 2.5623 | 2.5635 | 2.5647 | 2.5658 | 2.5670 |
| | 6 | 10 | 2.5682 | 2.5694 | 2.5705 | 2.5717 | 2.5729 | 2.5740 | 2.5752 | 2.5763 | 2.5775 | 2.5786 |
| | 6 | 20 | 2.5798 | 2.5809 | 2.5821 | 2.5832 | 2.5843 | 2.5855 | 2.5866 | 2.5877 | 2.5888 | 2.5899 |
| | 6 | 30 | 2.5911 | 2.5922 | 2.5933 | 2.5944 | 2.5955 | 2.5966 | 2.5977 | 2.5988 | 2.5999 | 2.6010 |
| | 6 | 40 | 2.6021 | 2.6031 | 2.6042 | 2.6053 | 2.6064 | 2.6075 | 2.6085 | 2.6096 | 2.6107 | 2.6117 |
| | 6 | 50 | 2.6128 | 2.6138 | 2.6149 | 2.6160 | 2.6170 | 2.6180 | 2.6191 | 2.6201 | 2.6212 | 2.6222 |
| 0 | 7 | 0 | 2.6232 | 2.6243 | 2.6253 | 2.6263 | 2.6274 | 2.6284 | 2.6294 | 2.6304 | 2.6314 | 2.6325 |
| | 7 | 10 | 2.6335 | 2.6345 | 2.6355 | 2.6365 | 2.6375 | 2.6385 | 2.6395 | 2.6405 | 2.6415 | 2.6425 |
| | 7 | 20 | 2.6435 | 2.6444 | 2.6454 | 2.6464 | 2.6474 | 2.6484 | 2.6493 | 2.6503 | 2.6513 | 2.6522 |
| | 7 | 30 | 2.6532 | 2.6542 | 2.6551 | 2.6561 | 2.6571 | 2.6580 | 2.6590 | 2.6599 | 2.6609 | 2.6618 |
| | 7 | 40 | 2.6628 | 2.6637 | 2.6646 | 2.6656 | 2.6665 | 2.6675 | 2.6684 | 2.6693 | 2.6702 | 2.6712 |
| | 7 | 50 | 2.6721 | 2.6730 | 2.6739 | 2.6749 | 2.6758 | 2.6767 | 2.6776 | 2.6785 | 2.6794 | 2.6803 |
| 0 | 8 | 0 | 2.6812 | 2.6821 | 2.6830 | 2.6839 | 2.6848 | 2.6857 | 2.6866 | 2.6875 | 2.6884 | 2.6893 |
| | 8 | 10 | 2.6902 | 2.6911 | 2.6920 | 2.6928 | 2.6937 | 2.6946 | 2.6955 | 2.6964 | 2.6972 | 2.6981 |
| | 8 | 20 | 2.6990 | 2.6998 | 2.7007 | 2.7016 | 2.7024 | 2.7033 | 2.7042 | 2.7050 | 2.7059 | 2.7067 |
| | 8 | 30 | 2.7076 | 2.7084 | 2.7093 | 2.7101 | 2.7110 | 2.7118 | 2.7126 | 2.7135 | 2.7143 | 2.7152 |
| | 8 | 40 | 2.7160 | 2.7168 | 2.7177 | 2.7185 | 2.7193 | 2.7202 | 2.7210 | 2.7218 | 2.7226 | 2.7235 |
| | 8 | 50 | 2.7243 | 2.7251 | 2.7259 | 2.7267 | 2.7275 | 2.7284 | 2.7292 | 2.7300 | 2.7308 | 2.7316 |
| 0 | 9 | 0 | 2.7324 | 2.7332 | 2.7340 | 2.7348 | 2.7356 | 2.7364 | 2.7372 | 2.7380 | 2.7388 | 2.7396 |
| | 9 | 10 | 2.7404 | 2.7412 | 2.7419 | 2.7427 | 2.7435 | 2.7443 | 2.7451 | 2.7459 | 2.7466 | 2.7474 |
| | 9 | 20 | 2.7482 | 2.7490 | 2.7497 | 2.7505 | 2.7513 | 2.7520 | 2.7528 | 2.7536 | 2.7543 | 2.7551 |
| | 9 | 30 | 2.7559 | 2.7566 | 2.7574 | 2.7582 | 2.7589 | 2.7597 | 2.7604 | 2.7612 | 2.7619 | 2.7627 |
| | 9 | 40 | 2.7634 | 2.7642 | 2.7649 | 2.7657 | 2.7664 | 2.7672 | 2.7679 | 2.7686 | 2.7694 | 2.7701 |
| | 9 | 50 | 2.7709 | 2.7716 | 2.7723 | 2.7731 | 2.7738 | 2.7745 | 2.7752 | 2.7760 | 2.7767 | 2.7774 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{0}{}^{h}\cdot\overset{\prime}{10}{}^{m}\cdot\overset{\prime\prime}{0}{}^{s}$ | 2.7782 | 2.7789 | 2.7796 | 2.7803 | 2.7810 | 2.7818 | 2.7825 | 2.7832 | 2.7839 | 2.7846 |
| 10 10 | 2.7853 | 2.7860 | 2.7868 | 2.7875 | 2.7882 | 2.7889 | 2.7896 | 2.7903 | 2.7910 | 2.7917 |
| 10 20 | 2.7924 | 2.7931 | 2.7938 | 2.7945 | 2.7952 | 2.7959 | 2.7966 | 2.7973 | 2.7980 | 2.7987 |
| 10 30 | 2.7993 | 2.8000 | 2.8007 | 2.8014 | 2.8021 | 2.8028 | 2.8035 | 2.8041 | 2.8048 | 2.8055 |
| 10 40 | 2.8062 | 2.8069 | 2.8075 | 2.8082 | 2.8089 | 2.8096 | 2.8102 | 2.8109 | 2.8116 | 2.8122 |
| 10 50 | 2.8129 | 2.8136 | 2.8142 | 2.8149 | 2.8156 | 2.8162 | 2.8169 | 2.8176 | 2.8182 | 2.8189 |
| 0 11 0 | 2.8195 | 2.8202 | 2.8209 | 2.8215 | 2.8222 | 2.8228 | 2.8235 | 2.8241 | 2.8248 | 2.8254 |
| 11 10 | 2.8261 | 2.8267 | 2.8274 | 2.8280 | 2.8287 | 2.8293 | 2.8299 | 2.8306 | 2.8312 | 2.8319 |
| 11 20 | 2.8325 | 2.8331 | 2.8338 | 2.8344 | 2.8351 | 2.8357 | 2.8363 | 2.8370 | 2.8376 | 2.8382 |
| 11 30 | 2.8388 | 2.8395 | 2.8401 | 2.8407 | 2.8414 | 2.8420 | 2.8426 | 2.8432 | 2.8439 | 2.8445 |
| 11 40 | 2.8451 | 2.8457 | 2.8463 | 2.8470 | 2.8476 | 2.8482 | 2.8488 | 2.8494 | 2.8500 | 2.8506 |
| 11 50 | 2.8513 | 2.8519 | 2.8525 | 2.8531 | 2.8537 | 2.8543 | 2.8549 | 2.8555 | 2.8561 | 2.8567 |
| 0 12 0 | 2.8573 | 2.8579 | 2.8585 | 2.8591 | 2.8597 | 2.8603 | 2.8609 | 2.8615 | 2.8621 | 2.8627 |
| 12 10 | 2.8633 | 2.8639 | 2.8645 | 2.8651 | 2.8657 | 2.8663 | 2.8669 | 2.8675 | 2.8681 | 2.8686 |
| 12 20 | 2.8692 | 2.8698 | 2.8704 | 2.8710 | 2.8716 | 2.8722 | 2.8727 | 2.8733 | 2.8739 | 2.8745 |
| 12 30 | 2.8751 | 2.8756 | 2.8762 | 2.8768 | 2.8774 | 2.8779 | 2.8785 | 2.8791 | 2.8797 | 2.8802 |
| 12 40 | 2.8808 | 2.8814 | 2.8820 | 2.8825 | 2.8831 | 2.8837 | 2.8842 | 2.8848 | 2.8854 | 2.8859 |
| 12 50 | 2.8865 | 2.8871 | 2.8876 | 2.8882 | 2.8887 | 2.8893 | 2.8899 | 2.8904 | 2.8910 | 2.8915 |
| 0 13 0 | 2.8921 | 2.8927 | 2.8932 | 2.8938 | 2.8943 | 2.8949 | 2.8954 | 2.8960 | 2.8965 | 2.8971 |
| 13 10 | 2.8976 | 2.8982 | 2.8987 | 2.8993 | 2.8998 | 2.9004 | 2.9009 | 2.9015 | 2.9020 | 2.9025 |
| 13 20 | 2.9031 | 2.9036 | 2.9042 | 2.9047 | 2.9053 | 2.9058 | 2.9063 | 2.9069 | 2.9074 | 2.9079 |
| 13 30 | 2.9085 | 2.9090 | 2.9096 | 2.9101 | 2.9106 | 2.9112 | 2.9117 | 2.9122 | 2.9128 | 2.9133 |
| 13 40 | 2.9138 | 2.9143 | 2.9149 | 2.9154 | 2.9159 | 2.9165 | 2.9170 | 2.9175 | 2.9180 | 2.9186 |
| 13 50 | 2.9191 | 2.9196 | 2.9201 | 2.9206 | 2.9212 | 2.9217 | 2.9222 | 2.9227 | 2.9232 | 2.9238 |
| 0 14 0 | 2.9243 | 2.9248 | 2.9253 | 2.9258 | 2.9263 | 2.9269 | 2.9274 | 2.9279 | 2.9284 | 2.9289 |
| 14 10 | 2.9294 | 2.9299 | 2.9304 | 2.9309 | 2.9315 | 2.9320 | 2.9325 | 2.9330 | 2.9335 | 2.9340 |
| 14 20 | 2.9345 | 2.9350 | 2.9355 | 2.9360 | 2.9365 | 2.9370 | 2.9375 | 2.9380 | 2.9385 | 2.9390 |
| 14 30 | 2.9395 | 2.9400 | 2.9405 | 2.9410 | 2.9415 | 2.9420 | 2.9425 | 2.9430 | 2.9435 | 2.9440 |
| 14 40 | 2.9445 | 2.9450 | 2.9455 | 2.9460 | 2.9465 | 2.9469 | 2.9474 | 2.9479 | 2.9484 | 2.9489 |
| 14 50 | 2.9494 | 2.9499 | 2.9504 | 2.9509 | 2.9513 | 2.9518 | 2.9523 | 2.9528 | 2.9533 | 2.9538 |
| 0 15 0 | 2.9542 | 2.9547 | 2.9552 | 2.9557 | 2.9562 | 2.9566 | 2.9571 | 2.9576 | 2.9581 | 2.9586 |
| 15 10 | 2.9590 | 2.9595 | 2.9600 | 2.9605 | 2.9609 | 2.9614 | 2.9619 | 2.9624 | 2.9628 | 2.9633 |
| 15 20 | 2.9638 | 2.9643 | 2.9647 | 2.9652 | 2.9657 | 2.9661 | 2.9666 | 2.9671 | 2.9675 | 2.9680 |
| 15 30 | 2.9685 | 2.9689 | 2.9694 | 2.9699 | 2.9703 | 2.9708 | 2.9713 | 2.9717 | 2.9722 | 2.9727 |
| 15 40 | 2.9731 | 2.9736 | 2.9741 | 2.9745 | 2.9750 | 2.9754 | 2.9759 | 2.9763 | 2.9768 | 2.9773 |
| 15 50 | 2.9777 | 2.9782 | 2.9786 | 2.9791 | 2.9795 | 2.9800 | 2.9805 | 2.9809 | 2.9814 | 2.9818 |
| 0 16 0 | 2.9823 | 2.9827 | 2.9832 | 2.9836 | 2.9841 | 2.9845 | 2.9850 | 2.9854 | 2.9859 | 2.9863 |
| 16 10 | 2.9868 | 2.9872 | 2.9877 | 2.9881 | 2.9886 | 2.9890 | 2.9894 | 2.9899 | 2.9903 | 2.9908 |
| 16 20 | 2.9912 | 2.9917 | 2.9921 | 2.9926 | 2.9930 | 2.9934 | 2.9939 | 2.9943 | 2.9948 | 2.9952 |
| 16 30 | 2.9956 | 2.9961 | 2.9965 | 2.9969 | 2.9974 | 2.9978 | 2.9983 | 2.9987 | 2.9991 | 2.9996 |
| 16 40 | 3.0000 | 3.0004 | 3.0009 | 3.0013 | 3.0017 | 3.0022 | 3.0026 | 3.0030 | 3.0035 | 3.0039 |
| 16 50 | 3.0043 | 3.0048 | 3.0052 | 3.0056 | 3.0060 | 3.0065 | 3.0069 | 3.0073 | 3.0077 | 3.0082 |
| 0 17 0 | 3.0086 | 3.0090 | 3.0095 | 3.0099 | 3.0103 | 3.0107 | 3.0111 | 3.0116 | 3.0120 | 3.0124 |
| 17 10 | 3.0128 | 3.0133 | 3.0137 | 3.0141 | 3.0145 | 3.0149 | 3.0154 | 3.0158 | 3.0162 | 3.0166 |
| 17 20 | 3.0170 | 3.0175 | 3.0179 | 3.0183 | 3.0187 | 3.0191 | 3.0195 | 3.0199 | 3.0204 | 2.0208 |
| 17 30 | 3.0212 | 3.0216 | 3.0220 | 3.0224 | 3.0228 | 3.0233 | 3.0237 | 3.0241 | 3.0245 | 3.0249 |
| 17 40 | 3.0253 | 3.0257 | 3.0261 | 3.0265 | 3.0269 | 3.0273 | 3.0278 | 3.0282 | 3.0286 | 3.0290 |
| 17 50 | 3.0294 | 3.0298 | 3.0302 | 3.0306 | 3.0310 | 3.0314 | 3.0318 | 3.0322 | 3.0326 | 3.0330 |
| 0 18 0 | 3.0334 | 3.0338 | 3.0342 | 3.0346 | 3.0350 | 3.0354 | 3.0358 | 3.0362 | 3.0366 | 3.0370 |
| 18 10 | 3.0374 | 3.0378 | 3.0382 | 3.0386 | 3.0390 | 3.0394 | 3 0398 | 3.0402 | 3.0406 | 3.0410 |
| 18 20 | 3.0414 | 3.0418 | 3.0422 | 3.0426 | 3.0430 | 3.0434 | 3.0438 | 3.0441 | 3.0445 | 3.0449 |
| 18 30 | 3.0453 | 3.0457 | 3.0461 | 3.0465 | 3.0469 | 3.0473 | 3.0477 | 3.0481 | 3.0484 | 3.0488 |
| 18 40 | 3.0492 | 3.0496 | 3.0500 | 3.0504 | 3.0508 | 3.0512 | 3.0515 | 3.0519 | 3.0523 | 3.0527 |
| 18 50 | 3.0531 | 3.0535 | 3.0538 | 3.0542 | 3.0546 | 3.0550 | 3.0554 | 3 0558 | 3.0561 | 3.0565 |
| 0 19 0 | 3.0569 | 3.0573 | 3.0577 | 3.0580 | 3.0584 | 3.0588 | 3.0592 | 3.0596 | 3.0599 | 3.0603 |
| 19 10 | 3.0607 | 3.0611 | 3.0615 | 3.0618 | 3.0622 | 3.0626 | 3.0630 | 3.0633 | 3.0637 | 3.0641 |
| 19 20 | 3.0645 | 3.0648 | 3.0652 | 3.0656 | 3.0660 | 3.0663 | 3.0667 | 3.0671 | 3.0674 | 3.0678 |
| 19 30 | 3.0682 | 3.0686 | 3.0689 | 3.0693 | 3.0697 | 3.0700 | 3.0704 | 3.0708 | 3.0711 | 3.0715 |
| 19 40 | 3.0719 | 3.0722 | 3.0726 | 3.0730 | 3.0734 | 3.0737 | 3.0741 | 3.0745 | 3.0748 | 3.0752 |
| 19 50 | 3.0755 | 3.0759 | 3.0763 | 3.0766 | 3.0770 | 3.0774 | 3.0777 | 3.0781 | 3.0785 | 3.0788 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | $\overset{\prime\prime}{0}$ | $\overset{\prime\prime}{1}$ | $\overset{\prime\prime}{2}$ | $\overset{\prime\prime}{3}$ | $\overset{\prime\prime}{4}$ | $\overset{\prime\prime}{5}$ | $\overset{\prime\prime}{6}$ | $\overset{\prime\prime}{7}$ | $\overset{\prime\prime}{8}$ | $\overset{\prime\prime}{9}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{0}{}^{h}$ | $\overset{\prime}{20}{}^{m}$ | $\overset{\prime\prime}{0}{}^{s}$ | 3.0792 | 3.0795 | 3.0799 | 3.0803 | 3.0806 | 3.0810 | 3.0813 | 3.0817 | 3.0821 | 3.0824 |
| | 20 | 10 | 3.0828 | 3.0831 | 3.0835 | 3.0839 | 3.0842 | 3.0846 | 3.0849 | 3.0853 | 3.0856 | 3.0860 |
| | 20 | 20 | 3.0864 | 3.0867 | 3.0871 | 3.0874 | 3.0878 | 3.0881 | 3.0885 | 3.0888 | 3.0892 | 3.0896 |
| | 20 | 30 | 3.0899 | 3.0903 | 3.0906 | 3.0910 | 3.0913 | 3.0917 | 3.0920 | 3.0924 | 3.0927 | 3.0931 |
| | 20 | 40 | 3.0934 | 3.0938 | 3.0941 | 3.0945 | 3.0948 | 3.0952 | 3.0955 | 3.0959 | 3.0962 | 3.0966 |
| | 20 | 50 | 3.0969 | 3.0973 | 3.0976 | 3.0980 | 3.0983 | 3.0986 | 3.0990 | 3.0993 | 3.0997 | 3.1000 |
| 0 | 21 | 0 | 3.1004 | 3.1007 | 3.1011 | 3.1014 | 3.1017 | 3.1021 | 3.1024 | 3.1028 | 3.1031 | 3.1035 |
| | 21 | 10 | 3.1038 | 3.1041 | 3.1045 | 3.1048 | 3.1052 | 3.1055 | 3.1059 | 3.1062 | 3.1065 | 3.1069 |
| | 21 | 20 | 3.1072 | 3.1075 | 3.1079 | 3.1082 | 3.1086 | 3.1089 | 3.1092 | 3.1096 | 3.1099 | 3.1103 |
| | 21 | 30 | 3.1106 | 3.1109 | 3.1113 | 3.1116 | 3.1119 | 3.1123 | 3.1126 | 3.1129 | 3.1133 | 3.1136 |
| | 21 | 40 | 3.1139 | 3.1143 | 3.1146 | 3.1149 | 3.1153 | 3.1156 | 3.1159 | 3.1163 | 3.1166 | 3.1169 |
| | 21 | 50 | 3.1173 | 3.1176 | 3.1179 | 3.1183 | 3.1186 | 3.1189 | 3.1193 | 3.1196 | 3.1199 | 3.1202 |
| 0 | 22 | 0 | 3.1206 | 3.1209 | 3.1212 | 3.1216 | 3.1219 | 3.1222 | 3.1225 | 3.1229 | 3.1232 | 3.1235 |
| | 22 | 10 | 3.1239 | 3.1242 | 3.1245 | 3.1248 | 3.1252 | 3.1255 | 3.1258 | 3.1261 | 3.1265 | 3.1268 |
| | 22 | 20 | 3.1271 | 3.1274 | 3.1278 | 3.1281 | 3.1284 | 3.1287 | 3.1290 | 3.1294 | 3.1297 | 3.1300 |
| | 22 | 30 | 3.1303 | 3.1307 | 3.1310 | 3.1313 | 3.1316 | 3.1319 | 3.1323 | 3.1326 | 3.1329 | 3.1332 |
| | 22 | 40 | 3.1335 | 3.1339 | 3.1342 | 3.1345 | 3.1348 | 3.1351 | 3.1355 | 3.1358 | 3.1361 | 3.1364 |
| | 22 | 50 | 3.1367 | 3.1370 | 3.1374 | 3.1377 | 3.1380 | 3.1383 | 3.1386 | 3.1389 | 3.1392 | 3.1396 |
| 0 | 23 | 0 | 3.1399 | 3.1402 | 3.1405 | 3.1408 | 3.1411 | 3.1414 | 3.1418 | 3 1421 | 3.1424 | 3.1427 |
| | 23 | 10 | 3.1430 | 3.1433 | 3.1436 | 3.1440 | 3.1443 | 3.1446 | 3.1449 | 3.1452 | 3.1455 | 3.1458 |
| | 23 | 20 | 3.1461 | 3.1464 | 3.1467 | 3.1471 | 3.1474 | 3.1477 | 3.1480 | 3.1483 | 3.1486 | 3.1489 |
| | 23 | 30 | 3.1492 | 3.1495 | 3.1498 | 3.1501 | 3.1504 | 3.1508 | 3.1511 | 3.1514 | 3.1517 | 3.1520 |
| | 23 | 40 | 3.1523 | 3.1526 | 3.1529 | 3.1532 | 3.1535 | 3.1538 | 3.1541 | 3.1544 | 3.1547 | 3.1550 |
| | 23 | 50 | 3.1553 | 3.1556 | 3.1559 | 3.1562 | 3.1565 | 3.1569 | 3.1572 | 3.1575 | 3.1578 | 3.1581 |
| 0 | 24 | 0 | 3.1584 | 3.1587 | 3.1590 | 3.1593 | 3.1596 | 3.1599 | 3.1602 | 3.1605 | 3.1608 | 3.1611 |
| | 24 | 10 | 3.1614 | 3.1617 | 3.1620 | 3.1623 | 3.1626 | 3.1629 | 3.1632 | 3.1635 | 3.1638 | 3.1641 |
| | 24 | 20 | 3.1644 | 3.1647 | 3.1649 | 3.1652 | 3.1655 | 3.1658 | 3.1661 | 3.1664 | 3.1667 | 3.1670 |
| | 24 | 30 | 3.1673 | 3.1676 | 3.1679 | 3.1682 | 3.1685 | 3.1688 | 3.1691 | 3.1694 | 3.1697 | 3.1700 |
| | 24 | 40 | 3.1703 | 3.1706 | 3.1708 | 3.1711 | 3.1714 | 3 1717 | 3.1720 | 3.1723 | 3.1726 | 3.1729 |
| | 24 | 50 | 3.1732 | 3.1735 | 3.1738 | 3.1741 | 3.1744 | 3.1746 | 3.1749 | 3.1752 | 3.1755 | 3.1758 |
| 0 | 25 | 0 | 3.1761 | 3.1764 | 3.1767 | 3.1770 | 3.1772 | 3.1775 | 3.1778 | 3.1781 | 3.1784 | 3.1787 |
| | 25 | 10 | 3.1790 | 3.1793 | 3.1796 | 3.1798 | 3.1801 | 3.1804 | 3.1807 | 3.1810 | 3.1813 | 3.1816 |
| | 25 | 20 | 3.1818 | 3.1821 | 3.1824 | 3.1827 | 3.1830 | 3.1833 | 3.1836 | 3.1838 | 3.1841 | 3.1844 |
| | 25 | 30 | 3.1847 | 3.1850 | 3.1853 | 3.1855 | 3.1858 | 3.1861 | 3.1864 | 3.1867 | 3.1870 | 3.1872 |
| | 25 | 40 | 3.1875 | 3.1878 | 3.1881 | 3.1884 | 3.1886 | 3.1889 | 3.1892 | 3.1895 | 3.1898 | 3.1901 |
| | 25 | 50 | 3.1903 | 3.1906 | 3.1909 | 3.1912 | 3.1915 | 3.1917 | 3.1920 | 3.1923 | 3.1926 | 3.1928 |
| 0 | 26 | 0 | 3.1931 | 3.1934 | 3.1937 | 3.1940 | 3.1942 | 3.1945 | 3.1948 | 3.1951 | 3.1953 | 3.1956 |
| | 26 | 10 | 3.1959 | 3.1962 | 3.1965 | 3.1967 | 3.1970 | 3.1973 | 3.1976 | 3.1978 | 3.1981 | 3.1984 |
| | 26 | 20 | 3.1987 | 3.1989 | 3.1992 | 3.1995 | 3.1998 | 3.2000 | 3.2003 | 3.2006 | 3.2009 | 3.2011 |
| | 26 | 30 | 3.2014 | 3.2017 | 3.2019 | 3.2022 | 3.2025 | 3.2028 | 3.2030 | 3.2033 | 3.2036 | 3.2038 |
| | 26 | 40 | 3.2041 | 3.2044 | 3.2047 | 3.2049 | 3.2052 | 3.2055 | 3.2057 | 3.2060 | 3.2063 | 3.2066 |
| | 26 | 50 | 3.2068 | 3.2071 | 3.2074 | 3.2076 | 3.2079 | 3.2082 | 3.2084 | 3.2087 | 3.2090 | 3.2092 |
| 0 | 27 | 0 | 3.2095 | 3.2098 | 3.2101 | 3.2103 | 3.2106 | 3.2109 | 3.2111 | 3.2114 | 3.2117 | 3.2119 |
| | 27 | 10 | 3.2122 | 3.2125 | 3.2127 | 3.2130 | 3.2133 | 3.2135 | 3.2138 | 3.2140 | 3.2143 | 3.2146 |
| | 27 | 20 | 3.2148 | 3.2151 | 3.2154 | 3.2156 | 3.2159 | 3.2162 | 3.2164 | 3.2167 | 3.2170 | 3.2172 |
| | 27 | 30 | 3.2175 | 3.2177 | 3.2180 | 3.2183 | 3.2185 | 3.2188 | 3.2191 | 3.2193 | 3.2196 | 3.2198 |
| | 27 | 40 | 3.2201 | 3.2204 | 3.2206 | 3.2209 | 3.2212 | 3.2214 | 3.2217 | 3.2219 | 3.2222 | 3.2225 |
| | 27 | 50 | 3.2227 | 3.2230 | 3.2232 | 3.2235 | 3.2238 | 3.2240 | 3.2243 | 3.2245 | 3.2248 | 3.2250 |
| 0 | 28 | 0 | 3.2253 | 3.2256 | 3.2258 | 3.2261 | 3.2263 | 3.2266 | 3.2269 | 3.2271 | 3.2274 | 3.2276 |
| | 28 | 10 | 3.2279 | 3.2281 | 3.2284 | 3.2287 | 3.2289 | 3.2292 | 3.2294 | 3.2297 | 3.2299 | 3.2302 |
| | 28 | 20 | 3.2304 | 3.2307 | 3.2310 | 3.2312 | 3.2315 | 3.2317 | 3.2320 | 3.2322 | 3.2325 | 3.2327 |
| | 28 | 30 | 3.2330 | 3.2333 | 3.2335 | 3.2338 | 3.2340 | 3.2343 | 3.2345 | 3.2348 | 3.2350 | 3.2353 |
| | 28 | 40 | 3.2355 | 3.2358 | 3.2360 | 3.2363 | 3.2365 | 3.2368 | 3.2370 | 3.2373 | 3.2375 | 3.2378 |
| | 28 | 50 | 3.2380 | 3.2383 | 3.2385 | 3.2388 | 3.2390 | 3.2393 | 3.2395 | 3.2398 | 3.2400 | 3.2403 |
| 0 | 29 | 0 | 3.2405 | 3.2408 | 3.2410 | 3.2413 | 3.2415 | 3.2418 | 3.2420 | 3.2423 | 3.2425 | 3.2428 |
| | 29 | 10 | 3.2430 | 3.2433 | 3.2435 | 3.2438 | 3.2440 | 3.2443 | 3.2445 | 3.2448 | 3.2450 | 3.2453 |
| | 29 | 20 | 3.2455 | 3.2458 | 3.2460 | 3.2463 | 3.2465 | 3.2467 | 3.2470 | 3.2472 | 3.2475 | 3.2477 |
| | 29 | 30 | 3.2480 | 3.2482 | 3.2485 | 3.2487 | 3.2490 | 3.2492 | 3.2494 | 3.2497 | 3.2499 | 3.2502 |
| | 29 | 40 | 3.2504 | 3.2507 | 3.2509 | 3.2512 | 3.2514 | 3.2516 | 3.2519 | 3.2521 | 3.2524 | 3.2526 |
| | 29 | 50 | 3.2529 | 3.2531 | 3.2533 | 3.2536 | 3.2538 | 3.2541 | 3.2543 | 3.2545 | 3.2548 | 3.2550 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{0}{}^{h}\ \overset{\prime}{30}{}^{m}\ \overset{\prime\prime}{0}{}^{s}$ | 3.2553 | 3.2555 | 3.2558 | 3.2560 | 3.2562 | 3.2565 | 3.2567 | 3.2570 | 3.2572 | 3.2574 |
| 30 10 | 3.2577 | 3.2579 | 3.2582 | 3.2584 | 3.2586 | 3.2589 | 3.2591 | 3.2594 | 3.2596 | 3.2598 |
| 30 20 | 3.2601 | 3.2603 | 3.2605 | 3.2608 | 3.2610 | 3.2613 | 3.2615 | 3.2617 | 3.2620 | 3.2622 |
| 30 30 | 3.2625 | 3.2627 | 3.2629 | 3.2632 | 3.2634 | 3.2636 | 3.2639 | 3.2641 | 3.2643 | 3.2646 |
| 30 40 | 3.2648 | 3.2651 | 3.2653 | 3.2655 | 3.2658 | 3.2660 | 3.2662 | 3.2665 | 3.2667 | 3.2669 |
| 30 50 | 3.2672 | 3.2674 | 3.2676 | 3.2679 | 3.2681 | 3.2683 | 3.2686 | 3.2688 | 3.2690 | 3.2693 |
| 0 31 0 | 3.2695 | 3.2697 | 3.2700 | 3.2702 | 3.2704 | 3.2707 | 3.2709 | 3.2711 | 3.2714 | 3.2716 |
| 31 10 | 3.2718 | 3.2721 | 3.2723 | 3.2725 | 3.2728 | 3.2730 | 3.2732 | 3.2735 | 3.2737 | 3.2739 |
| 31 20 | 3.2742 | 3.2744 | 3.2746 | 3.2749 | 3.2751 | 3.2753 | 3.9755 | 3.2758 | 3.2760 | 3.2762 |
| 31 30 | 3.2765 | 3.2767 | 3.2769 | 3.2772 | 3.2774 | 3.2776 | 3.2778 | 3.2781 | 3.2783 | 3.2785 |
| 31 40 | 3.2788 | 3.2790 | 3.2792 | 3.2794 | 3.2797 | 3.2799 | 3.2801 | 3.2804 | 3.2806 | 3.2808 |
| 31 50 | 3.2810 | 3.2813 | 3.2815 | 3.2817 | 3.2819 | 3.2822 | 3.2824 | 3.2826 | 3.2828 | 3.2831 |
| 0 32 0 | 3.2833 | 3.2835 | 3.2838 | 3.2840 | 3.2842 | 3.2844 | 3.2847 | 3.2849 | 3.2851 | 3.2853 |
| 32 10 | 3.2856 | 3.2858 | 3.2860 | 3.2862 | 3.2865 | 3.2867 | 3.2869 | 3.2871 | 3.2874 | 3.2876 |
| 32 20 | 3.2878 | 3.2880 | 3.2882 | 3.2885 | 3.2887 | 3.2889 | 3.2891 | 3.2894 | 3.2896 | 3.2898 |
| 32 30 | 3.2900 | 3.2903 | 3.2905 | 3.2907 | 3.2909 | 3.2911 | 3.2914 | 3.2916 | 3.2918 | 3.2920 |
| 32 40 | 3.2923 | 3.2925 | 3.2927 | 3.2929 | 3.2931 | 3.2934 | 3.2936 | 3.2938 | 3.2940 | 3.2942 |
| 32 50 | 3.2945 | 3.2947 | 3.2949 | 3.2951 | 3.2953 | 3.2956 | 3.2958 | 3.2960 | 3.2962 | 3.2964 |
| 0 33 0 | 3.2967 | 3.2969 | 3.2971 | 3.2973 | 3.2975 | 3.2978 | 3.2980 | 3.2982 | 3.2984 | 3.2986 |
| 33 10 | 3.2989 | 3.2991 | 3.2993 | 3.2995 | 3.2997 | 3.2999 | 3.3002 | 3.3004 | 3.3006 | 3.3008 |
| 33 20 | 3.3010 | 3.3012 | 3.3015 | 3.3017 | 3.3019 | 3.3021 | 3.3023 | 3.3025 | 3.3028 | 3.3030 |
| 33 30 | 3.3032 | 3.3034 | 3.3036 | 3.3038 | 3.3041 | 3.3043 | 3.3045 | 3.3047 | 3.3049 | 3.3051 |
| 33 40 | 3.3054 | 3.3056 | 3.3058 | 3.3060 | 3.3062 | 3.3064 | 3.3066 | 3.3069 | 3.3071 | 3.3073 |
| 33 50 | 3.3075 | 3.3077 | 3.3079 | 3.3081 | 3.3084 | 3.3086 | 3.3088 | 3.3090 | 3.3092 | 3.3094 |
| 0 34 0 | 3.3096 | 3.3098 | 3.3101 | 3.3103 | 3.3105 | 3.3107 | 3.3109 | 3.3111 | 3.3113 | 3.3115 |
| 34 10 | 3.3118 | 3.3120 | 3.3122 | 3.3124 | 3.3126 | 3.3128 | 3.3130 | 3.3132 | 3.3134 | 3.3137 |
| 34 20 | 3.3139 | 3.3141 | 3.3143 | 3.3145 | 3.3147 | 3.3149 | 3.3151 | 3.3153 | 3.3156 | 3.3158 |
| 34 30 | 3.3160 | 3.3162 | 3.3164 | 3.3166 | 3.3168 | 3.3170 | 3.3172 | 3.3174 | 3.3176 | 3.3179 |
| 34 40 | 3.3181 | 3.3183 | 3.3185 | 3.3187 | 3.3189 | 3.3191 | 3.3193 | 3.3195 | 3.3197 | 3.3199 |
| 34 50 | 3.3201 | 3.3204 | 3.3206 | 3.3208 | 3.3210 | 3.3212 | 3.3214 | 3.3216 | 3.3218 | 3.3220 |
| 0 35 0 | 3.3222 | 3.3224 | 3.3226 | 3.3228 | 3.3230 | 3.3233 | 3.3235 | 3.3237 | 3.3239 | 3.3241 |
| 35 10 | 3.3243 | 3.3245 | 3.3247 | 3.3249 | 3.3251 | 3.3253 | 3.3255 | 3.3257 | 3.3259 | 3.3261 |
| 35 20 | 3.3263 | 3.3265 | 3.3267 | 3.3269 | 3.3272 | 3.3274 | 3.3276 | 3.3278 | 3.3280 | 3.3282 |
| 35 30 | 3.3284 | 3.3286 | 3.3288 | 3.3290 | 3.3292 | 3.3294 | 3.3296 | 3.3298 | 3.3300 | 3.3302 |
| 35 40 | 3.3304 | 3.3306 | 3.3308 | 3.3310 | 3.3312 | 3.3314 | 3.3316 | 3.3318 | 3.3320 | 3.3322 |
| 35 50 | 3.3324 | 3.3326 | 3.3328 | 3.3330 | 3.3332 | 3.3334 | 3.3336 | 3.3339 | 3.3341 | 3.3343 |
| 0 36 0 | 3.3345 | 3.3347 | 3.3349 | 3.3351 | 3.3353 | 3.3355 | 3.3357 | 3.3359 | 3.3361 | 3.3363 |
| 36 10 | 3.3365 | 3.3367 | 3.3369 | 3.3371 | 3.3373 | 3.3375 | 3.3377 | 3.3379 | 3.3381 | 3.3383 |
| 36 20 | 3.3385 | 3.3387 | 3.3389 | 3.3391 | 3.3393 | 3.3395 | 3.3397 | 3.3398 | 3.3400 | 3.3402 |
| 36 30 | 3.3404 | 3.3406 | 3.3408 | 3.3410 | 3.3412 | 3.3414 | 3.3416 | 3.3418 | 3.3420 | 3.3422 |
| 36 40 | 3.3424 | 3.3426 | 3.3428 | 3.3430 | 3.3432 | 3.3434 | 3.3436 | 3.3438 | 3.3440 | 3.3442 |
| 36 50 | 3.3444 | 3.3446 | 3.3448 | 3.3450 | 3.3452 | 3.3454 | 3.3456 | 3.3458 | 3.3460 | 3.3462 |
| 0 37 0 | 3.3464 | 3.3465 | 3.3467 | 3.3469 | 3.3471 | 3.3473 | 3.3475 | 3.3477 | 3.3479 | 3.3481 |
| 37 10 | 3.3483 | 3.3485 | 3.3487 | 3.3489 | 3.3491 | 3.3493 | 3.3495 | 3.3497 | 3.3499 | 3.3501 |
| 37 20 | 3.3502 | 3.3504 | 3.3506 | 3.3508 | 3.3510 | 3.3512 | 3.3514 | 3.3516 | 3.3518 | 3.3520 |
| 37 30 | 3.3522 | 3.3524 | 3.3526 | 3.3528 | 3.3530 | 3.3531 | 3.3533 | 3.3535 | 3.3537 | 3.3539 |
| 37 40 | 3.3541 | 3.3543 | 3.3545 | 3.3547 | 3.3549 | 3.3551 | 3.3553 | 3.3555 | 3.3556 | 3.3558 |
| 37 50 | 3.3560 | 3.3562 | 3.3564 | 3.3566 | 3.3568 | 3.3570 | 3.3572 | 3.3574 | 3.3576 | 3.3577 |
| 0 38 0 | 3.3579 | 3.3581 | 3.3583 | 3.3585 | 3.3587 | 3.3589 | 3.3591 | 3.3593 | 3.3595 | 3.3596 |
| 38 10 | 3.3598 | 3.3600 | 3.3602 | 3.3604 | 3.3606 | 3.3608 | 3.3610 | 3.3612 | 3.3614 | 3.3615 |
| 38 20 | 3.3617 | 3.3619 | 3.3621 | 3.3623 | 3.3625 | 3.3627 | 3.3629 | 3.3630 | 3.3632 | 3.3634 |
| 38 30 | 3.3636 | 3.3638 | 3.3640 | 3.3642 | 3.3644 | 3.3646 | 3.3647 | 3.3649 | 3.3651 | 3.3653 |
| 38 40 | 3.3655 | 3.3657 | 3.3659 | 3.3660 | 3.3662 | 3.3664 | 3.3666 | 3.3668 | 3.3670 | 3.3672 |
| 38 50 | 3.3674 | 3.3675 | 3.3677 | 3.3679 | 3.3681 | 3.3683 | 3.3685 | 3.3687 | 3.3688 | 3.3690 |
| 0 39 0 | 3.3692 | 3.3694 | 3.3696 | 3.3698 | 3.3700 | 3.3701 | 3.3703 | 3.3705 | 3.3707 | 3.3709 |
| 39 10 | 3.3711 | 3.3713 | 3.3714 | 3.3716 | 3.3718 | 3.3720 | 3.3722 | 3.3724 | 3.3725 | 3.3727 |
| 39 20 | 3.3729 | 3.3731 | 3.3733 | 3.3735 | 3.3736 | 3.3738 | 3.3740 | 3.3742 | 3.3744 | 3.3746 |
| 39 30 | 3.3747 | 3.3749 | 3.3751 | 3.3753 | 3.3755 | 3.3757 | 3.3758 | 3.3760 | 3.3762 | 3.3764 |
| 39 40 | 3.3766 | 3.3768 | 3.3769 | 3.3771 | 3.3773 | 3.3775 | 3.3777 | 3.3779 | 3.3780 | 3.3782 |
| 39 50 | 3.3784 | 3.3786 | 3.3788 | 3.3789 | 3.3791 | 3.3793 | 3.3795 | 3.3797 | 3.3798 | 3.3800 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | ′ | ″ | | | | | | | | | | |
| 0h. | 40m. | 0s. | 3.3802 | 3.3804 | 3.3806 | 3.3808 | 3.3809 | 3.3811 | 3.3813 | 3.3815 | 3.3817 | 3.3818 |
| | 40 | 10 | 3.3820 | 3.3822 | 3.3824 | 3.3826 | 3.3827 | 3.3829 | 3.3831 | 3.3833 | 3.3835 | 3.3836 |
| | 40 | 20 | 3.3838 | 3.3840 | 3.3842 | 3.3844 | 3.3845 | 3.3847 | 3.3849 | 3.3851 | 3.3852 | 3.3854 |
| | 40 | 30 | 3.3856 | 3.3858 | 3.3860 | 3.3861 | 3.3863 | 3.3865 | 3.3867 | 3.3869 | 3.3870 | 3.3872 |
| | 40 | 40 | 3.3874 | 3.3876 | 3.3877 | 3.3879 | 3.3881 | 3.3883 | 3.3885 | 3.3886 | 3.3888 | 3.3890 |
| | 40 | 50 | 3.3892 | 3.3893 | 3.3895 | 3.3897 | 3.3899 | 3.3901 | 3.3902 | 3.3904 | 3.3906 | 3.3908 |
| 0 | 41 | 0 | 3.3909 | 3.3911 | 3.3913 | 3.3915 | 3.3916 | 3.3918 | 3.3920 | 3.3922 | 3.3923 | 3.3925 |
| | 41 | 10 | 3.3927 | 3.3929 | 3.3930 | 3.3932 | 3.3934 | 3.3936 | 3.3938 | 3.3939 | 3.3941 | 3.3943 |
| | 41 | 20 | 3.3945 | 3.3946 | 3.3948 | 3.3950 | 3 3952 | 3.3953 | 3.3955 | 3.3957 | 3.3959 | 3.3960 |
| | 41 | 30 | 3.3962 | 3.3964 | 3.3965 | 3.3967 | 3.3969 | 3.3971 | 3.3972 | 3.3974 | 3.3976 | 3.3978 |
| | 41 | 40 | 3.3979 | 3.3981 | 3.3983 | 3.3985 | 3.3986 | 3.3988 | 3.3990 | 3.3992 | 3.3993 | 3.3995 |
| | 41 | 50 | 3.3997 | 3.3998 | 3.4000 | 3.4002 | 3.4004 | 3.4005 | 3.4007 | 3.4009 | 3.4011 | 3.4012 |
| 0 | 42 | 0 | 3.4014 | 3.4016 | 3.4017 | 3.4019 | 3.4021 | 3.4023 | 3.4024 | 3.4026 | 3.4028 | 3.4029 |
| | 42 | 10 | 3.4031 | 3.4033 | 3.4035 | 3.4036 | 3.4038 | 3.4040 | 3.4041 | 3.4043 | 3.4045 | 3.4047 |
| | 42 | 20 | 3.4048 | 3.4050 | 3.4052 | 3.4053 | 3.4055 | 3.4057 | 3.4059 | 3.4060 | 3.4062 | 3.4064 |
| | 42 | 30 | 3.4065 | 3.4067 | 3.4069 | 3.4071 | 3.4072 | 3.4074 | 3.4076 | 3.4077 | 3.4079 | 3.4081 |
| | 42 | 40 | 3.4082 | 3.4084 | 3.4086 | 3.4087 | 3.4089 | 3.4091 | 3.4093 | 3.4094 | 3.4096 | 3.4098 |
| | 42 | 50 | 3.4099 | 3.4101 | 3.4103 | 3.4104 | 3.4106 | 3.4108 | 3.4109 | 3.4111 | 3.4113 | 3.4115 |
| 0 | 43 | 0 | 3.4116 | 3.4118 | 3.4120 | 3.4121 | 3.4123 | 3.4125 | 3.4126 | 3.4128 | 3.4130 | 3.4131 |
| | 43 | 10 | 3.4133 | 3.4135 | 3.4136 | 3.4138 | 3.4140 | 3.4141 | 3.4143 | 3.4145 | 3.4146 | 3.4148 |
| | 43 | 20 | 3.4150 | 3.4151 | 3.4153 | 3.4155 | 3.4156 | 3.4158 | 3.4160 | 3.4161 | 3.4163 | 3.4165 |
| | 43 | 30 | 3.4166 | 3.4168 | 3.4170 | 3.4171 | 3.4173 | 3.4175 | 3.4176 | 3.4178 | 3.4180 | 3.4181 |
| | 43 | 40 | 3 4183 | 3.4185 | 3.4186 | 3.4188 | 3.4190 | 3.4191 | 3.4193 | 3.4195 | 3.4196 | 3.4198 |
| | 43 | 50 | 3.4200 | 3.4201 | 3.4203 | 3.4205 | 3.4206 | 3.4208 | 3.4209 | 3.4211 | 3.4213 | 3.4214 |
| 0 | 44 | 0 | 3.4216 | 3.4218 | 3.4219 | 3.4221 | 3.4223 | 3.4224 | 3.4226 | 3.4228 | 3.4229 | 3.4231 |
| | 44 | 10 | 3.4232 | 3.4234 | 3.4236 | 3.4237 | 3.4239 | 3.4241 | 3.4242 | 3.4244 | 3.4246 | 3.4247 |
| | 44 | 20 | 3.4249 | 3.4250 | 3.4252 | 3.4254 | 3.4255 | 3.4257 | 3.4259 | 3.4260 | 3.4262 | 3.4263 |
| | 44 | 30 | 3.4265 | 3.4267 | 3.4268 | 3.4270 | 3.4272 | 3.4273 | 3.4275 | 3.4276 | 3.4278 | 3.4280 |
| | 44 | 40 | 3.4281 | 3.4283 | 3.4285 | 3.4286 | 3.4288 | 3.4289 | 3.4291 | 3.4293 | 3.4294 | 3.4296 |
| | 44 | 50 | 3.4298 | 3.4299 | 3.4301 | 3.4302 | 3.4304 | 3.4306 | 3.4307 | 3.4309 | 3.4310 | 3.4312 |
| 0 | 45 | 0 | 3.4314 | 3.4315 | 3.4317 | 3.4318 | 3.4320 | 3.4322 | 3.4323 | 3.4325 | 3.4326 | 3.4128 |
| | 45 | 10 | 3.4330 | 3.4331 | 3.4333 | 3.4334 | 3.4336 | 3.4338 | 3.4339 | 3.4341 | 3.4342 | 3.4144 |
| | 45 | 20 | 3.4346 | 3.4347 | 3.4349 | 3.4350 | 3.4352 | 3.4354 | 3.4355 | 3.4357 | 3.4358 | 3.4360 |
| | 45 | 30 | 3.4362 | 3.4363 | 3.4365 | 3.4366 | 3.4368 | 3.4370 | 3.4371 | 3.4373 | 3.4374 | 3.4376 |
| | 45 | 40 | 3.4378 | 3.4379 | 3.4381 | 3.4382 | 3.4384 | 3.4385 | 3.4387 | 3.4389 | 3.4390 | 3.4392 |
| | 45 | 50 | 3.4393 | 3.4395 | 3.4396 | 3.4398 | 3.4400 | 3.4401 | 3.4403 | 3.4404 | 3.4406 | 3.4408 |
| 0 | 46 | 0 | 3.4409 | 3.4411 | 3.4412 | 3.4414 | 3.4415 | 3.4417 | 3.4419 | 3.4420 | 3.4422 | 3.4423 |
| | 46 | 10 | 3.4425 | 3.4426 | 3.4428 | 3.4429 | 3.4431 | 3.4433 | 3.4434 | 3.4436 | 3.4437 | 3.4439 |
| | 46 | 20 | 3.4440 | 3.4442 | 3.4444 | 3.4445 | 3.4447 | 3.4448 | 3.4450 | 3.4451 | 3.4453 | 3.4454 |
| | 46 | 30 | 3.4456 | 3.4458 | 3.4459 | 3.4461 | 3.4462 | 3.4464 | 3.4465 | 3.4467 | 3.4468 | 3.4470 |
| | 46 | 40 | 3.4472 | 3.4473 | 3.4475 | 3.4476 | 3.4478 | 3.4479 | 3.4481 | 3.4482 | 3.4484 | 3.4486 |
| | 46 | 50 | 3.4487 | 3.4489 | 3.4490 | 3.4492 | 3.4493 | 3.4495 | 3.4496 | 3.4498 | 3.4499 | 3.4501 |
| 0 | 47 | 0 | 3.4502 | 3.4504 | 3.4506 | 3.4507 | 3.4509 | 3.4510 | 3.4512 | 3.4513 | 3.4515 | 3.4516 |
| | 47 | 10 | 3.4518 | 3.4519 | 3.4521 | 3.4522 | 3.4524 | 3.4526 | 3.4527 | 3.4529 | 3.4530 | 3.4532 |
| | 47 | 20 | 3.4533 | 3.4535 | 3.4536 | 3.4538 | 3.4539 | 3.4541 | 3.4542 | 3.4544 | 3.4545 | 3.4547 |
| | 47 | 30 | 3.4548 | 3.4550 | 3.4551 | 3.4553 | 3.4555 | 3.4556 | 3.4558 | 3.4559 | 3.4561 | 3.4562 |
| | 47 | 40 | 3.4564 | 3.4565 | 3.4567 | 3.4568 | 3.4570 | 3.4571 | 3.4573 | 3.4574 | 3.4576 | 3.4577 |
| | 47 | 50 | 3.4579 | 3.4580 | 3.4582 | 3.4583 | 3.4585 | 3.4586 | 3.4588 | 3.4589 | 3.4591 | 3.4592 |
| 0 | 48 | 0 | 3.4594 | 3.4595 | 3.4597 | 3.4598 | 3.4600 | 3.4601 | 3.4603 | 3.4604 | 3.4606 | 3.4607 |
| | 48 | 10 | 3.4609 | 3.4610 | 3.4612 | 3.4613 | 3.4615 | 3.4616 | 3.4618 | 3.4619 | 3.4621 | 3.4622 |
| | 48 | 20 | 3.4624 | 3.4625 | 3.4627 | 3.4628 | 3.4630 | 3.4631 | 3.4633 | 3.4634 | 3.4636 | 3.4637 |
| | 48 | 30 | 3.4639 | 3.4640 | 3.4642 | 3.4643 | 3.4645 | 3.4646 | 3.4648 | 3.4649 | 3.4651 | 3.4652 |
| | 48 | 40 | 3.4654 | 3.4655 | 3.4657 | 3.4658 | 3.4660 | 3.4661 | 3.4663 | 3.4664 | 3.4666 | 3.4667 |
| | 48 | 50 | 3.4669 | 3.4670 | 3.4672 | 3.4673 | 3.4675 | 3.4676 | 3.4678 | 3.4679 | 3.4681 | 3.4682 |
| 0 | 49 | 0 | 3.4683 | 3.4685 | 3.4686 | 3.4688 | 3.4689 | 3.4691 | 3.4692 | 3.4694 | 3.4695 | 3.4697 |
| | 49 | 10 | 3.4698 | 3.4700 | 3.4701 | 3.4703 | 3.4704 | 3.4706 | 3.4707 | 3.4709 | 3.4610 | 3.4711 |
| | 49 | 20 | 3.4713 | 3.4714 | 3.4716 | 3.4717 | 3.4719 | 3.4720 | 3.4722 | 3.4723 | 3.4725 | 3.4726 |
| | 49 | 30 | 3.4728 | 3.4729 | 3.4730 | 3.4732 | 3.4733 | 3.4735 | 3.4736 | 3.4738 | 3.4739 | 3.4741 |
| | 49 | 40 | 3.4742 | 3.4744 | 3.4745 | 3.4747 | 3.4748 | 3.4749 | 3.4751 | 3.4752 | 3.4754 | 3.4755 |
| | 49 | 50 | 3.4757 | 3.4758 | 3.4760 | 3.4761 | 3.4763 | 3.4764 | 3.4765 | 3.4767 | 3.4768 | 3.4770 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{0}{}^{h}\cdot\overset{\prime}{50}{}^{m}\cdot\overset{\prime\prime}{0}{}^{s}$ | 3.4771 | 3.4773 | 3.4774 | 3.4776 | 3.4777 | 3.4778 | 3.4780 | 3.4781 | 3.4783 | 3.4784 |
| 50 10 | 3.4786 | 3.4787 | 3.4789 | 3.4790 | 3.4791 | 3.4793 | 3.4794 | 3.4796 | 3.4797 | 3.4799 |
| 50 20 | 3 4800 | 3.4802 | 3.4803 | 3.4804 | 3.4806 | 3.4807 | 3.4809 | 3.4810 | 3.4812 | 3.4813 |
| 50 30 | 3.4814 | 3.4816 | 3.4817 | 3.4819 | 3.4820 | 3.4822 | 3.4823 | 3.4824 | 3.4826 | 3.4827 |
| 50 40 | 3.4829 | 3.4830 | 3.4832 | 3.4833 | 3.4834 | 3.4836 | 3.4837 | 3.4839 | 3.4840 | 3.4842 |
| 50 50 | 3.4843 | 3.4844 | 3.4846 | 3.4847 | 3.4849 | 3.4850 | 3.4852 | 3.4853 | 3.4854 | 3.4856 |
| 0 51 0 | 3.4857 | 3.4859 | 3.4860 | 3.4861 | 3.4863 | 3.4864 | 3.4866 | 3.4867 | 3.4869 | 3.4870 |
| 51 10 | 3.4871 | 3.4873 | 3.4874 | 3.4876 | 3.4877 | 3.4878 | 3.4880 | 3.4881 | 3.4883 | 3.4884 |
| 51 20 | 3.4886 | 3.4887 | 3.4888 | 3.4890 | 3.4891 | 3.4893 | 3.4894 | 3.4895 | 3.4897 | 3.4898 |
| 51 30 | 3.4900 | 3.4901 | 3.4902 | 3.4904 | 3.4905 | 3.4907 | 3.4908 | 3.4909 | 3.4911 | 3.4912 |
| 51 40 | 3.4914 | 3.4915 | 3.4916 | 3.4918 | 3.4919 | 3.4921 | 3.4922 | 3.4923 | 3.4925 | 3.4926 |
| 51 50 | 3.4928 | 3.4929 | 3.4930 | 3.4932 | 3.4933 | 3.4935 | 3.4936 | 3.4937 | 3.4939 | 3.4940 |
| 0 52 0 | 3.4942 | 3.4943 | 3.4944 | 3.4946 | 3.4947 | 3.4949 | 3.4950 | 3.4951 | 3.4953 | 3.4954 |
| 52 10 | 3.4955 | 3.4957 | 3.4958 | 3.4960 | 3.4961 | 3.4962 | 3.4964 | 3.4965 | 3.4967 | 3.4968 |
| 52 20 | 3.4969 | 3.4971 | 3.4972 | 3.4973 | 3.4975 | 3.4976 | 3.4978 | 3.4979 | 3.4980 | 3.4982 |
| 52 30 | 3.4983 | 3.4984 | 3.4986 | 3.4987 | 3.4989 | 3.4990 | 3.4991 | 3.4993 | 3.4994 | 3.4995 |
| 52 40 | 3.4997 | 3.4998 | 3.5000 | 3.5001 | 3.5002 | 3.5004 | 3.5005 | 3.5006 | 3.5008 | 3.5009 |
| 52 50 | 3.5011 | 3.5012 | 3.5013 | 3.5015 | 3.5016 | 3.5017 | 3.5019 | 3.5020 | 3.5022 | 3.5023 |
| 0 53 0 | 3.5024 | 3.5026 | 3.5027 | 3.5028 | 3.5030 | 3.5031 | 3.5032 | 3.5034 | 3.5035 | 3.5037 |
| 53 10 | 3.5038 | 3.5039 | 3.5041 | 3.5042 | 3.5043 | 3.5045 | 3.5046 | 3.5047 | 3.5049 | 3.5050 |
| 53 20 | 3.5051 | 3.5053 | 3.5054 | 3.5056 | 3.5057 | 3.5058 | 3.5060 | 3.5061 | 3.5062 | 3.5064 |
| 53 30 | 3.5065 | 3.5066 | 3.5068 | 3.5069 | 3.5070 | 3.5072 | 3.5073 | 3.5075 | 3.5076 | 3.5077 |
| 53 40 | 3.5079 | 3.5080 | 3.5081 | 3.5083 | 3.5084 | 3.5085 | 3.5087 | 3.5088 | 3.5089 | 3.5091 |
| 53 50 | 3.5092 | 3.5093 | 3.5095 | 3.5096 | 3.5097 | 3.5099 | 3.5100 | 3.5101 | 3.5103 | 3 5104 |
| 0 54 0 | 3.5105 | 3.5107 | 3.5108 | 3.5109 | 3.5111 | 3.5112 | 3.5113 | 3.5115 | 3.5116 | 3.5117 |
| 54 10 | 3.5119 | 3.5120 | 3.5122 | 3.5123 | 3.5124 | 3.5126 | 3.5127 | 3.5128 | 3.5130 | 3.5131 |
| 54 20 | 3.5132 | 3.5134 | 3.5135 | 3.5136 | 3.5138 | 3.5139 | 3.5140 | 3.5141 | 3.5143 | 3.5144 |
| 54 30 | 3.5145 | 3.5147 | 3.5148 | 3.5149 | 3.5151 | 3.5152 | 3.5153 | 3.5155 | 3.5156 | 3.5157 |
| 54 40 | 3.5159 | 3.5160 | 3.5161 | 3.5163 | 3.5164 | 3.5165 | 3.5167 | 3.5168 | 3.5169 | 3.5171 |
| 54 50 | 3.5172 | 3.5173 | 3.5175 | 3.5176 | 3.5177 | 3.5179 | 3.5180 | 3.5181 | 3.5183 | 3.5184 |
| 0 55 0 | 3.5185 | 3.5186 | 3.5188 | 3.5189 | 3.5190 | 3.5192 | 3.5193 | 3.5194 | 3.5196 | 3.5197 |
| 55 10 | 3.5198 | 3.5200 | 3.5201 | 3.5202 | 3.5204 | 3.5205 | 3.5206 | 3.5207 | 3.5209 | 3.5210 |
| 55 20 | 3.5211 | 3.5213 | 3.5214 | 3.5215 | 3.5217 | 3.5218 | 3.5219 | 3.5221 | 3.5222 | 3.5223 |
| 55 30 | 3.5224 | 3.5226 | 3.5227 | 3.5228 | 3.5230 | 3.5231 | 3.5232 | 3.5234 | 3.5235 | 3.5236 |
| 55 40 | 3.5237 | 3.5239 | 3.5240 | 3.5241 | 3.5243 | 3 5244 | 3.5245 | 3.5247 | 3.5248 | 3.5249 |
| 55 50 | 3.5250 | 3.5252 | 3.5253 | 3.5254 | 3.5256 | 3.5257 | 3.5258 | 3.5260 | 3.5261 | 3.5262 |
| 0 56 0 | 3.5263 | 3.5265 | 3.5266 | 3.5267 | 3.5269 | 3.5270 | 3.5271 | 3.5272 | 3.5274 | 3.5275 |
| 56 10 | 3.5276 | 3.5278 | 3.5279 | 3.5280 | 3.5281 | 3.5283 | 3.5284 | 3.5285 | 3.5287 | 3.5288 |
| 56 20 | 3.5289 | 3.5290 | 3.5292 | 3.5293 | 3.5294 | 3.5296 | 3.5297 | 3.5298 | 3.5299 | 3.5301 |
| 56 30 | 3.5302 | 3.5303 | 3.5305 | 3.5306 | 3.5307 | 3.5308 | 3.5310 | 3.5311 | 3.5312 | 3.5314 |
| 56 40 | 3.5315 | 3.5316 | 3.5317 | 3.5319 | 3.5320 | 3.5321 | 3.5322 | 3.5324 | 3.5325 | 3.5326 |
| 56 50 | 3.5328 | 3.5329 | 3.5330 | 3.5331 | 3.5333 | 3.5334 | 3.5335 | 3.5336 | 3.5338 | 3.5339 |
| 0 57 0 | 3.5340 | 3.5342 | 3.5343 | 3.5344 | 3.5345 | 3.5347 | 3.5348 | 3.5349 | 3.5350 | 3.5352 |
| 57 10 | 3.5353 | 3.5354 | 3.5355 | 3.5357 | 3.5358 | 3.5359 | 3.5361 | 3.5362 | 3.5363 | 3.5364 |
| 57 20 | 3.5366 | 3.5367 | 3.5368 | 3.5369 | 3.5371 | 3.5372 | 3 5373 | 3.5374 | 3.5376 | 3.5377 |
| 57 30 | 3.5378 | 3.5379 | 3.5381 | 3.5382 | 3.5383 | 3.5384 | 3.5386 | 3.5387 | 3.5388 | 3.5390 |
| 57 40 | 3.5391 | 3.5392 | 3.5393 | 3.5395 | 3.5396 | 3.5397 | 3.5398 | 3.5400 | 3.5401 | 3.5402 |
| 57 50 | 3.5403 | 3.5405 | 3.5406 | 3.5407 | 3.5408 | 3.5410 | 3.5411 | 3.5412 | 3.5413 | 3.5415 |
| 0 58 0 | 3.5416 | 3.5417 | 3.5418 | 3.5420 | 3.5421 | 3.5422 | 3.5423 | 3.5425 | 3.5426 | 3.5427 |
| 58 10 | 3.5428 | 3.5429 | 3.5431 | 3.5432 | 3.5433 | 3.5434 | 3 5436 | 3.5437 | 3.5438 | 3.5439 |
| 58 20 | 3.5441 | 3.5442 | 3.5443 | 3.5444 | 3.5446 | 3.5447 | 3.5448 | 3.5449 | 3.5451 | 3.5452 |
| 58 30 | 3.5453 | 3.5454 | 3.5456 | 3.5457 | 3.5458 | 3.5459 | 3.5460 | 3.5462 | 3.5463 | 3.5464 |
| 58 40 | 3.5465 | 3.5467 | 3.5468 | 3.5469 | 3.5470 | 3.5472 | 3.5473 | 3.5474 | 3.5475 | 3.5477 |
| 58 50 | 3.5478 | 3.5479 | 3.5480 | 3.5481 | 3.5483 | 3.5484 | 3.5485 | 3 5486 | 3.5488 | 3.5489 |
| 0 59 0 | 3.5490 | 3.5491 | 3.5492 | 3.5494 | 3.5495 | 3.5496 | 3.5497 | 3.5499 | 3.5500 | 3.5501 |
| 59 10 | 3.5502 | 3.5504 | 3.5505 | 3.5506 | 3.5507 | 3.5508 | 3.5510 | 3.5511 | 3.5512 | 3.5513 |
| 59 20 | 3.5514 | 3.5516 | 3.5517 | 3.5518 | 3.5519 | 3.5521 | 3.5522 | 3.5523 | 3.5524 | 3.5525 |
| 59 30 | 3.5527 | 3.5528 | 3.5529 | 3.5530 | 3.5532 | 3.5533 | 3.5534 | 3.5535 | 3.5536 | 3.5538 |
| 59 40 | 3.5539 | 3.5540 | 3.5541 | 3.5542 | 3.5544 | 3.5545 | 3.5546 | 3.5547 | 3.5549 | 3.5550 |
| 59 50 | 3.5551 | 3.5552 | 3.5553 | 3.5555 | 3.5556 | 3.5557 | 3.5558 | 3.5559 | 3.5561 | 3.5562 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. ° | ′ | ″ | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1h. | 0m. | 0s. | 3.5563 | 3.5564 | 3.5565 | 3.5567 | 3.5568 | 3.5569 | 3.5570 | 3.5571 | 3.5573 | 3.5574 |
| | 0 | 10 | 3.5575 | 3.5576 | 3.5577 | 3.5579 | 3.5580 | 3.5581 | 3.5582 | 3.5583 | 3.5585 | 3.5586 |
| | 0 | 20 | 3.5587 | 3.5588 | 3.5589 | 3.5591 | 3.5592 | 3.5593 | 3.5594 | 3.5595 | 3.5597 | 3.5598 |
| | 0 | 30 | 3.5599 | 3.5600 | 3.5601 | 3.5603 | 3.5604 | 3.5605 | 3.5606 | 3.5607 | 3.5609 | 3.5610 |
| | 0 | 40 | 3.5611 | 3.5612 | 3.6613 | 3.5615 | 3.5616 | 3.5617 | 3.5618 | 3.5619 | 3.5621 | 3.5622 |
| | 0 | 50 | 3.5623 | 3.5624 | 3.5625 | 3.5626 | 3.5628 | 3.5629 | 3.5630 | 3.5631 | 3.5632 | 3.5634 |
| 1 | 1 | 0 | 3.5635 | 3.5636 | 3.5637 | 3.5638 | 3.5640 | 3.5641 | 3.5642 | 3.5643 | 3.5644 | 3 5645 |
| | 1 | 10 | 3.5647 | 3.5648 | 3.5649 | 3.5650 | 3.5651 | 3.5653 | 3.5654 | 3.5655 | 3.5656 | 3.5657 |
| | 1 | 20 | 3.5658 | 3.5660 | 3.5661 | 3.5662 | 3.5663 | 3.5664 | 3.5666 | 3.5667 | 3.5668 | 3.5669 |
| | 1 | 30 | 3.5670 | 3.5671 | 3.5673 | 3.5674 | 3.5675 | 3.5676 | 3.5677 | 3.5678 | 3.5680 | 3.5681 |
| | 1 | 40 | 3.5682 | 3.5683 | 3.5684 | 3.5686 | 3.5687 | 3.5688 | 3.5689 | 3.5690 | 3.5691 | 3.5693 |
| | 1 | 50 | 3.5694 | 3.5695 | 3.5696 | 3 5697 | 3.5698 | 3.5700 | 3.5701 | 3.5702 | 3.5703 | 3.5704 |
| 1 | 2 | 0 | 3.5705 | 3.5707 | 3.5708 | 3.5709 | 3.5710 | 3.5711 | 3.5712 | 3.5714 | 3.5715 | 3.5716 |
| | 2 | 10 | 3.5717 | 3.5718 | 3.5719 | 3.5721 | 3.5722 | 3.5723 | 3.5724 | 3.5725 | 3.5726 | 3 5728 |
| | 2 | 20 | 3.5729 | 3.5730 | 3.5731 | 3.5732 | 3.5733 | 3.5735 | 3.5736 | 3.5737 | 3.5738 | 3.5739 |
| | 2 | 30 | 3.5740 | 3.5741 | 3.5742 | 3.5744 | 3.5745 | 3.5746 | 3.5747 | 3.5748 | 3.5750 | 3.5751 |
| | 2 | 40 | 3.5752 | 3.5753 | 3.5754 | 3.5755 | 3.5756 | 3.5758 | 3.5759 | 3.5760 | 3.5761 | 3.5762 |
| | 2 | 50 | 3.5763 | 3.5765 | 3.5766 | 3.5767 | 3.5768 | 3.5769 | 3.5770 | 3.5771 | 3.5773 | 3.5774 |
| 1 | 3 | 0 | 3.5775 | 3.5776 | 3.5777 | 3.5778 | 3.5780 | 3.5781 | 3.5782 | 3 5783 | 3.5784 | 3.5785 |
| | 3 | 10 | 3.5786 | 3.5788 | 3.5789 | 3.5790 | 3 5791 | 3.5792 | 3.5793 | 3.5794 | 3.5796 | 3.5797 |
| | 3 | 20 | 3.5798 | 3.5799 | 3.5800 | 3.5801 | 3.5802 | 3.5804 | 3.5805 | 3.5806 | 3.5807 | 3.5808 |
| | 3 | 30 | 3.5809 | 3.5810 | 3.5812 | 3.5813 | 3.5814 | 3.5815 | 3.5816 | 3.5817 | 3.5818 | 3.5819 |
| | 3 | 40 | 3.5821 | 3.5822 | 3.5823 | 3.5824 | 3.5825 | 3.5826 | 3.5827 | 3.5829 | 3.5830 | 3.5831 |
| | 3 | 50 | 3.5832 | 3.5833 | 3.5834 | 3.5835 | 3.5837 | 3.5838 | 3.5839 | 3.5840 | 3.5841 | 3.5842 |
| 1 | 4 | 0 | 3.5843 | 3.5844 | 3.5846 | 3.5847 | 3.5848 | 3.5849 | 3.5850 | 3.5851 | 3.5852 | 3.5853 |
| | 4 | 10 | 3.5855 | 3.5856 | 3.5857 | 3.5858 | 3.5859 | 3.5860 | 3.5861 | 3.5862 | 3.5864 | 3.5865 |
| | 4 | 20 | 3.5866 | 3.5867 | 3.5868 | 3.5869 | 3.5870 | 3.5871 | 3.5873 | 3.5874 | 3.5875 | 3.5876 |
| | 4 | 30 | 3.5877 | 3.5878 | 3.5879 | 3.5880 | 3.5882 | 3.5883 | 3.5884 | 3.5885 | 3.5886 | 3.5887 |
| | 4 | 40 | 3.5888 | 3.5889 | 3.5891 | 3.5892 | 3.5893 | 3.5894 | 3.5895 | 3.5896 | 3.5897 | 3.5898 |
| | 4 | 50 | 3.5899 | 3.5901 | 3.5902 | 3.5903 | 3.5904 | 3.5905 | 3.5906 | 3.5907 | 3.5908 | 3.5910 |
| 1 | 5 | 0 | 3.5911 | 3.5912 | 3.5913 | 3.5914 | 3.5915 | 3.5916 | 3.5917 | 3.5918 | 3.5920 | 3.5921 |
| | 5 | 10 | 3.5922 | 3.5923 | 3.5924 | 3.5925 | 3.5926 | 3.5927 | 3.5928 | 3.5930 | 3.5931 | 3.5932 |
| | 5 | 20 | 3.5833 | 3.5934 | 3.5935 | 3.5936 | 3.5937 | 3.5938 | 3.5940 | 3.5941 | 3.5942 | 3.5943 |
| | 5 | 30 | 3.5944 | 3.5945 | 3.5946 | 3.5947 | 3.5948 | 3.5949 | 3.5951 | 3.5952 | 3.5953 | 3.5954 |
| | 5 | 40 | 3.5955 | 3.5956 | 3.5957 | 3.5958 | 3.5959 | 3.5960 | 3.5962 | 3.5963 | 3.5964 | 3.5965 |
| | 5 | 50 | 3.5966 | 3.5967 | 3.5968 | 3.5969 | 3.5970 | 3.5971 | 3.5973 | 3.5974 | 3.5975 | 3.5976 |
| 1 | 6 | 0 | 3.5977 | 3.5978 | 3.5979 | 3.5980 | 3.5981 | 3.5982 | 3.5984 | 3.5985 | 3.5986 | 3.5987 |
| | 6 | 10 | 3.5988 | 3.5989 | 3.5990 | 3.5991 | 3.5992 | 3.5993 | 3.5994 | 3.5996 | 3.5997 | 3.5998 |
| | 6 | 20 | 3.5999 | 3.6000 | 3.6001 | 3.6002 | 3.6003 | 3.6004 | 3.6005 | 3.6006 | 3.6008 | 3.6009 |
| | 6 | 30 | 3.6010 | 3.6011 | 3.6012 | 3.6013 | 3.6014 | 3.6015 | 3.6016 | 3.6017 | 3.6018 | 3.6020 |
| | 6 | 40 | 3.6021 | 3.6022 | 3.6023 | 3.6024 | 3.6025 | 3.6026 | 3.6027 | 3.6028 | 3.6029 | 3.6030 |
| | 6 | 50 | 3.6031 | 3.6033 | 3.6034 | 3.6035 | 3.6036 | 3.6037 | 3.6038 | 3.6039 | 3.6040 | 3.6041 |
| 1 | 7 | 0 | 3.6042 | 3.6043 | 3.6044 | 3.6046 | 3.6047 | 3.6048 | 3.6049 | 3.6050 | 3.6051 | 3.6052 |
| | 7 | 10 | 3.6053 | 3.6054 | 3.6055 | 3.6056 | 3.6057 | 3.6058 | 3.6060 | 3.6061 | 3.6062 | 3.6063 |
| | 7 | 20 | 3.6064 | 3.6065 | 3.6066 | 3.6067 | 3.6068 | 3.6069 | 3.6070 | 3.6071 | 3.6072 | 3.6073 |
| | 7 | 30 | 3.6075 | 3.6076 | 3.6077 | 3.6078 | 3.6079 | 3.6080 | 3.6081 | 3.6082 | 3.6083 | 3.6084 |
| | 7 | 40 | 3.6085 | 3.6086 | 3.6087 | 3.6088 | 3.6090 | 3.6091 | 3.6092 | 3.6093 | 3.6094 | 3.6095 |
| | 7 | 50 | 3.6096 | 3.6097 | 3.6098 | 3.6099 | 3.6100 | 3.6101 | 3.6102 | 3.6103 | 3.6104 | 3.6106 |
| 1 | 8 | 0 | 3.6107 | 3.6108 | 3.6109 | 3.6110 | 3.6111 | 3.6112 | 3.6113 | 3.6114 | 3.6115 | 3.6116 |
| | 8 | 10 | 3.6117 | 3.6118 | 3.6119 | 3.6120 | 3.6121 | 3.6123 | 3.6124 | 3.6125 | 3.6126 | 3.6127 |
| | 8 | 20 | 3.6128 | 3.6129 | 3.6130 | 3.6131 | 3.6132 | 3.6133 | 3.6134 | 3.6135 | 3.6136 | 3.6137 |
| | 8 | 30 | 3.6138 | 3.6139 | 3.6141 | 3.6142 | 3.6143 | 3.6144 | 3.6145 | 3.6146 | 3.6147 | 3.6148 |
| | 8 | 40 | 3.6149 | 3.6150 | 3.6151 | 3.6152 | 3.6153 | 3.6154 | 3.6155 | 3.6156 | 3.6157 | 3.6158 |
| | 8 | 50 | 3.6160 | 3.6161 | 3.6162 | 3.6163 | 3.6164 | 3.6165 | 3.6166 | 3.6167 | 3.6168 | 3.6169 |
| 1 | 9 | 0 | 3.6170 | 3.6171 | 3.6172 | 3.6173 | 3.6174 | 3.6175 | 3.6176 | 3.6177 | 3.6178 | 3.6179 |
| | 9 | 10 | 3.6180 | 3.6182 | 3.6183 | 3.6184 | 3.6185 | 3.6186 | 3.6187 | 3.6188 | 3.6189 | 3 6190 |
| | 9 | 20 | 3.6191 | 3.6192 | 3.6193 | 3.6194 | 3.6195 | 3.6196 | 3.6197 | 3.6198 | 3.6199 | 3.6200 |
| | 9 | 30 | 3.6201 | 3.6202 | 3.6203 | 3.6204 | 3.6206 | 3.6207 | 3.6208 | 3.6209 | 3.6210 | 3.6211 |
| | 9 | 40 | 3.6212 | 3.6213 | 3.6214 | 3.6215 | 3.6216 | 3.6217 | 3.6218 | 3.6219 | 3.6220 | 3.6221 |
| | 9 | 50 | 3.6222 | 3.6223 | 3.6224 | 3.6225 | 3.6226 | 3.6227 | 3.6228 | 3.6229 | 3.6230 | 3.6231 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{1}^{h}\cdot\overset{\prime}{10}^{m}\cdot\overset{\prime\prime}{0}^{s}$ | 3.6232 | 3.6234 | 3.6235 | 3.6236 | 3.6237 | 3.6238 | 3.6239 | 3.6240 | 3.6241 | 3.6242 |
| 10 10 | 3.6243 | 3.6244 | 3.6245 | 3.6246 | 3.6247 | 3.6248 | 3.6249 | 3.6250 | 3.6251 | 3.6252 |
| 10 20 | 3.6253 | 3.6254 | 3.6255 | 3.6256 | 3.6257 | 3.6258 | 3.6259 | 3.6260 | 3.6261 | 3.6262 |
| 10 30 | 3.6263 | 3.6264 | 3.6265 | 3.6266 | 3.6268 | 3.6269 | 3.6270 | 3.6271 | 3.6272 | 3.6273 |
| 10 40 | 3.6274 | 3.6275 | 3.6276 | 3.6277 | 3.6278 | 3.6279 | 3.6280 | 3.6281 | 3.6282 | 3.6283 |
| 10 50 | 3.6284 | 3.6285 | 3.6286 | 3.6287 | 3.6288 | 3.6289 | 3.6290 | 3.6291 | 3.6292 | 3.6293 |
| 1 11 0 | 3.6294 | 3.6295 | 3.6296 | 3.6297 | 3.6298 | 3.6299 | 3.6300 | 3.6301 | 3.6302 | 3.6303 |
| 11 10 | 3.6304 | 3.6305 | 3.6306 | 3.6307 | 3.6308 | 3.6309 | 3.6310 | 3.6311 | 3 6312 | 3.6313 |
| 11 20 | 3.6314 | 3.6315 | 3.6316 | 3.6317 | 3.6318 | 3.6320 | 3.6321 | 3.6322 | 3.6323 | 3.6324 |
| 11 30 | 3.6325 | 3.6326 | 3.6327 | 3.6328 | 3.6329 | 3.6330 | 3.6331 | 3.6332 | 3.6333 | 3.6334 |
| 11 40 | 3.6335 | 3.6336 | 3.6337 | 3.6338 | 3.6339 | 3.6340 | 3.6341 | 3.6342 | 3.6343 | 3.6344 |
| 11 50 | 3.6345 | 3.6346 | 3.6347 | 3.6348 | 3.6349 | 3.6350 | 3.6351 | 3.6352 | 3.6353 | 3.6354 |
| 1 12 0 | 3.6355 | 3.6356 | 3.6357 | 3.6358 | 3.6359 | 3.6360 | 3.6361 | 3.6362 | 3.6363 | 3.6364 |
| 12 10 | 3.6365 | 3.6366 | 3.6367 | 3.6368 | 3.6369 | 3.6370 | 3.6371 | 3.6372 | 3.6373 | 3.6374 |
| 12 20 | 3.6375 | 3.6376 | 3.6377 | 3.6378 | 3.6379 | 3.6380 | 3.6381 | 3.6382 | 3.6383 | 3.6384 |
| 12 30 | 3.6385 | 3.6386 | 3.6387 | 3.6388 | 3.6389 | 3.6390 | 3.6391 | 3.6392 | 3.6393 | 3.6394 |
| 12 40 | 3.6395 | 3.6396 | 3.6397 | 3.6398 | 3.6399 | 3.6400 | 3.6401 | 3.6402 | 3.6403 | 3.6404 |
| 12 50 | 3.6405 | 3.6406 | 3.6407 | 3.6408 | 3.6409 | 3.6410 | 3.6411 | 3.6412 | 3.6413 | 3.6414 |
| 1 13 0 | 3.6415 | 3.6416 | 3.6417 | 3.6418 | 3.6419 | 3.6420 | 3.6421 | 3.6422 | 3.6423 | 3.6424 |
| 13 10 | 3.6425 | 3.6426 | 3.6427 | 3.6428 | 3.6429 | 3.6430 | 3.6431 | 3.6432 | 3.6433 | 3.6434 |
| 13 20 | 3.6435 | 3.6436 | 3.6437 | 3.6437 | 3.6438 | 3.6439 | 3.6440 | 3.6441 | 3.6442 | 3.6443 |
| 13 30 | 3.6444 | 3.6445 | 3.6446 | 3.6447 | 3.6448 | 3.6449 | 3.6450 | 3.6451 | 3.6452 | 3.6453 |
| 13 40 | 3.6454 | 3.6455 | 3.6456 | 3.6457 | 3.6458 | 3.6459 | 3.6460 | 3.6461 | 3.6462 | 3.6463 |
| 13 50 | 3.6464 | 3 6465 | 3.6466 | 3.6467 | 3.6468 | 3.6469 | 3.6470 | 3.6471 | 3.6472 | 3.6473 |
| 1 14 0 | 3.6474 | 3.6475 | 3.6476 | 3.6477 | 3.6478 | 3.6479 | 3.6480 | 3.6481 | 3.6482 | 3.6483 |
| 14 10 | 3.6484 | 3.6485 | 3.6486 | 3.6487 | 3.6488 | 3.6488 | 3.6489 | 3.6490 | 3.6491 | 3.6492 |
| 14 20 | 3.6493 | 3.6494 | 3.6495 | 3.6496 | 3.6497 | 3.6498 | 3.6499 | 3.6500 | 3.6501 | 3.6502 |
| 14 30 | 3.6503 | 3.6504 | 3.6505 | 3.6506 | 3.6507 | 3.6508 | 3.6509 | 3.6510 | 3.6511 | 3.6512 |
| 14 40 | 3.6513 | 3.6514 | 3.6515 | 3.6516 | 3.6517 | 3.6518 | 3.6519 | 3.6520 | 3.6521 | 3.6521 |
| 14 50 | 3.6522 | 3.6523 | 3.6524 | 3.6525 | 3.6526 | 3.6527 | 3.6528 | 3.6529 | 3.6530 | 3.6531 |
| 1 15 0 | 3.6532 | 3.6533 | 3.6534 | 3.6535 | 3.6536 | 3.6537 | 3.6538 | 3.6539 | 3.6540 | 3.6541 |
| 15 10 | 3.6542 | 3.6543 | 3.6544 | 3.6545 | 3.6546 | 3.6547 | 3.6548 | 3.6549 | 3.6549 | 3.6550 |
| 15 20 | 3.6551 | 3.6552 | 3.6553 | 3.6554 | 3.6555 | 3.6556 | 3.6557 | 3.6558 | 3.6559 | 3.6560 |
| 15 30 | 3.6561 | 3.6562 | 3.6563 | 3.6564 | 3.6565 | 3.6566 | 3.6567 | 3.6568 | 3.6569 | 3.6570 |
| 15 40 | 3.6571 | 3.6572 | 3.6572 | 3.6573 | 3.6574 | 3.6575 | 3.6576 | 3.6577 | 3.6578 | 3.6579 |
| 15 50 | 3.6580 | 3.6581 | 3.6582 | 3.6583 | 3.6584 | 3.6585 | 3.6586 | 3.6587 | 3 6588 | 3.6589 |
| 1 16 0 | 3.6590 | 3.6591 | 3.6592 | 3.6593 | 3.6593 | 3.6594 | 3.6595 | 3.6596 | 3.6597 | 3.6598 |
| 16 10 | 3.6599 | 3.6600 | 3.6601 | 3.6602 | 3.6603 | 3.6604 | 3.6605 | 3.6606 | 3.6607 | 3.6608 |
| 16 20 | 3.6609 | 3.6610 | 3.6611 | 3.6611 | 3.6612 | 3.6613 | 3.6614 | 3.6615 | 3.6616 | 3.6617 |
| 16 30 | 3.6618 | 3.6619 | 3.6620 | 3.6621 | 3.6622 | 3.6623 | 3.6624 | 3.6625 | 3.6626 | 3.6627 |
| 16 40 | 3.6628 | 3.6629 | 3.6629 | 3.6630 | 3.6631 | 3.6632 | 3.6633 | 3.6634 | 3.6635 | 3.6636 |
| 16 50 | 3.6637 | 3.6638 | 3.6639 | 3.6640 | 3.6641 | 3.6642 | 3.6643 | 3.6644 | 3.6645 | 3.6645 |
| 1 17 0 | 3.6646 | 3.6647 | 3.6648 | 3.6649 | 3.6650 | 3.6651 | 3.6652 | 3.6653 | 3.6654 | 3.6655 |
| 17 10 | 3.6656 | 3.6657 | 3.6658 | 3.6659 | 3.6660 | 3.6660 | 3.6661 | 3.6662 | 3.6663 | 3.6664 |
| 17 20 | 3.6665 | 3.6666 | 3.6667 | 3.6668 | 3.6669 | 3.6670 | 3.6671 | 3.6672 | 3.6673 | 3.6674 |
| 17 30 | 3.6675 | 3.6675 | 3.6676 | 3.6677 | 3.6678 | 3.6679 | 3.6680 | 3.6681 | 3.6682 | 3.6683 |
| 17 40 | 3.6684 | 3.6685 | 3.6686 | 3.6687 | 3.6688 | 3.6689 | 3.6689 | 3.6690 | 3.6691 | 3.6692 |
| 17 50 | 3.6693 | 3.6694 | 3.6695 | 3.6696 | 3.6697 | 3.6698 | 3.6699 | 3.6700 | 3.6701 | 3.6702 |
| 1 18 0 | 3.6702 | 3.6703 | 3.6704 | 3.6705 | 3.6706 | 3.6707 | 3.6708 | 3.6809 | 3.6710 | 3.6711 |
| 18 10 | 3.6712 | 3.6713 | 3.6714 | 3.6715 | 3.6715 | 3.6716 | 3.6717 | 3.6718 | 3.6719 | 3.6720 |
| 18 20 | 3.6721 | 3.6722 | 3.6723 | 3.6724 | 3.6725 | 3.6726 | 3.6727 | 3.6727 | 3.6728 | 3.6729 |
| 18 30 | 3.6730 | 3.6731 | 3.6732 | 3.6733 | 3.6734 | 3.6735 | 3.6736 | 3.6737 | 3.6738 | 3.6738 |
| 18 40 | 3.6739 | 3.6740 | 3.6741 | 3.6742 | 3.6743 | 3.6744 | 3.6745 | 3.6746 | 3.6747 | 3.6748 |
| 18 50 | 3.6749 | 3.6750 | 3 6750 | 3.6751 | 3.6752 | 3.6753 | 3.6754 | 3.6755 | 3.6756 | 3.6757 |
| 1 19 0 | 3.6758 | 3.6759 | 3.6760 | 3.6761 | 3.6761 | 3.6762 | 3.6763 | 3.6764 | 3.6765 | 3.6766 |
| 19 10 | 3.6767 | 3.6768 | 3.6769 | 3.6770 | 3.6771 | 3.6772 | 3.6772 | 3.6773 | 3.6774 | 3.6775 |
| 19 20 | 3.6776 | 3.6777 | 3.6778 | 3.6779 | 3.6780 | 3.6781 | 3.6782 | 3.6782 | 3.6783 | 3.6784 |
| 19 30 | 3.6785 | 3.6786 | 3.6787 | 3.6788 | 3.6789 | 3.6790 | 3.6791 | 3.6792 | 3.6792 | 3.6793 |
| 19 40 | 3.6794 | 3.6795 | 3 6796 | 3.6797 | 3.6798 | 3.6799 | 3.6800 | 3.6801 | 3.6802 | 3.6802 |
| 19 50 | 3.6803 | 3.6804 | 3.6805 | 3.6806 | 3.6807 | 3.6808 | 3.6809 | 3.6810 | 3.6811 | 3.6812 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | ′ | ″ | | | | | | | | | | |
| 1h. | 20m. | 0s. | 3.6812 | 3.6813 | 3.6814 | 3.6815 | 3.6816 | 3.6817 | 3.6818 | 3.6819 | 3.6820 | 3.6821 |
| | 20 | 10 | 3.6821 | 3.6822 | 3.6823 | 3.6824 | 3.6825 | 3.6826 | 3.6827 | 3.6828 | 3.6829 | 3.6830 |
| | 20 | 20 | 3.6830 | 3.6831 | 3.6832 | 3.6833 | 3.6834 | 3.6835 | 3.6836 | 3.6837 | 3.6838 | 3.6839 |
| | 20 | 30 | 3.6839 | 3.6840 | 3.6841 | 3.6842 | 3.6843 | 3.6844 | 3.6845 | 3.6846 | 3.6847 | 3.6848 |
| | 20 | 40 | 3.6848 | 3.6849 | 3.6850 | 3.6851 | 3.6852 | 3.6853 | 3.6854 | 3.6855 | 3.6856 | 3.6857 |
| | 20 | 50 | 3.6857 | 3.6858 | 3.6859 | 3.6860 | 3.6861 | 3.6862 | 3.6863 | 3.6864 | 3.6865 | 3.6865 |
| 1 | 21 | 0 | 3.6866 | 3.6867 | 3.6868 | 3.6869 | 3.6870 | 3.6871 | 3.6872 | 3.6873 | 3.6874 | 3.6874 |
| | 21 | 10 | 3.6875 | 3.6876 | 3.6877 | 3.6878 | 3.6879 | 3.6880 | 3.6881 | 3.6882 | 3.6882 | 3.6883 |
| | 21 | 20 | 3.6884 | 3.6885 | 3.6886 | 3.6887 | 3.6888 | 3.6889 | 3.6890 | 3.6890 | 3.6891 | 3.6892 |
| | 21 | 30 | 3.6893 | 3.6894 | 3.6895 | 3.6896 | 3.6897 | 3.6898 | 3.6898 | 3.6899 | 3.6900 | 3.6901 |
| | 21 | 40 | 3.6902 | 3.6903 | 3.6904 | 3.6905 | 3.6906 | 3.6906 | 3.6907 | 3.6908 | 3.6909 | 3.6910 |
| | 21 | 50 | 3.6911 | 3.6912 | 3.6913 | 3.6913 | 3.6914 | 3.6915 | 3.6916 | 3.6917 | 3.6918 | 3.6919 |
| 1 | 22 | 0 | 3.6920 | 3.6921 | 3.6921 | 3.6922 | 3.6923 | 3.6924 | 3.6925 | 3.6926 | 3.6927 | 3.6928 |
| | 22 | 10 | 3.6928 | 3.6929 | 3.6930 | 3.6931 | 3.6932 | 3.6933 | 3.6934 | 3.6935 | 3.6936 | 3.6936 |
| | 22 | 20 | 3.6937 | 3.6938 | 3.6939 | 3.6940 | 3.6941 | 3.6942 | 3.6943 | 3.6943 | 3.6944 | 3.6945 |
| | 22 | 30 | 3.6946 | 3.3947 | 3.6948 | 3.6949 | 3.6950 | 3.6950 | 3.6951 | 3.6952 | 3.6953 | 3.6954 |
| | 22 | 40 | 3.6955 | 3.6956 | 3.6957 | 3.6957 | 3.6958 | 3.6959 | 3.6960 | 3.6961 | 3.6962 | 3.6963 |
| | 22 | 50 | 3.6964 | 3.6964 | 3.6965 | 3.6966 | 3.6967 | 3.6968 | 3.6969 | 3.6970 | 3.6971 | 3.6971 |
| 1 | 23 | 0 | 3.6972 | 3.6973 | 3.6974 | 3.6975 | 3.6976 | 3.6977 | 3.6978 | 3.6978 | 3.6979 | 3.6980 |
| | 23 | 10 | 3.6981 | 3.6982 | 3.6983 | 3.6984 | 3.6984 | 3.6985 | 3.6986 | 3.6987 | 3.6988 | 3.6989 |
| | 23 | 20 | 3.6990 | 3.6991 | 3.6991 | 3.6992 | 3.6993 | 3.6994 | 3.6995 | 3.6996 | 3.6997 | 3.6998 |
| | 23 | 30 | 3.6998 | 3.6999 | 3.7000 | 3.7001 | 3.7002 | 3.7003 | 3.7004 | 3.7004 | 3.7005 | 3.7006 |
| | 23 | 40 | 3.7007 | 3.7008 | 3.7009 | 3.7010 | 3.7010 | 3.7011 | 3.7012 | 3.7013 | 3.7014 | 3.7015 |
| | 23 | 50 | 3.7016 | 3.7017 | 3.7017 | 3.7018 | 3.7019 | 3.7020 | 3.7021 | 3.7022 | 3.7023 | 3.7023 |
| 1 | 24 | 0 | 3.7024 | 3.7025 | 3.7026 | 3.7027 | 3.7028 | 3.7029 | 3.7029 | 3.7030 | 3.7031 | 3.7032 |
| | 24 | 10 | 3.7033 | 3.7034 | 3.7035 | 3.7035 | 3.7036 | 3.7037 | 3.7038 | 3.7039 | 3.7040 | 3.7041 |
| | 24 | 20 | 3.7042 | 3.7042 | 3.7043 | 3.7044 | 3.7045 | 3.7046 | 3.7047 | 3.7048 | 3.7048 | 3.7049 |
| | 24 | 30 | 3.7050 | 3.7051 | 3.7052 | 3.7053 | 3.7054 | 3.7054 | 3.7055 | 3.7056 | 3.7057 | 3.7058 |
| | 24 | 40 | 3.7059 | 3.7060 | 3.7060 | 3.7061 | 3.7062 | 3.7063 | 3.7064 | 3.7065 | 3.7065 | 3.7066 |
| | 24 | 50 | 3.7067 | 3.7068 | 3.7069 | 3.7070 | 3.7071 | 3.7071 | 3.7072 | 3.7073 | 3.7074 | 3.7075 |
| 1 | 25 | 0 | 3.7076 | 3.7077 | 3.7077 | 3.7078 | 3.7079 | 3.7080 | 3.7081 | 3.7082 | 3.7083 | 3.7083 |
| | 25 | 10 | 3.7084 | 3.7085 | 3.7086 | 3.7087 | 3.7088 | 3.7088 | 3.7089 | 3.7090 | 3.7091 | 3.7092 |
| | 25 | 20 | 3.7093 | 3.7094 | 3.7094 | 3.7095 | 3.7096 | 3.7097 | 3.7098 | 3.7099 | 3.7099 | 3.7100 |
| | 25 | 30 | 3.7101 | 3.7102 | 3.7103 | 3.7104 | 3.7105 | 3.7105 | 3.7106 | 3.7107 | 3.7108 | 3.7109 |
| | 25 | 40 | 3.7110 | 3.7110 | 3.7111 | 3.7112 | 3.7113 | 3.7114 | 3.7115 | 3.7116 | 3.7116 | 3.7117 |
| | 25 | 50 | 3.7118 | 3.7119 | 3.7120 | 3.7121 | 3.7121 | 3.7122 | 3.7123 | 3.7124 | 3.7125 | 3.7126 |
| 1 | 26 | 0 | 3.7126 | 3.7127 | 3.7128 | 3.7129 | 3.7130 | 3.7131 | 3.7132 | 3.7132 | 3.7133 | 3.7134 |
| | 26 | 10 | 3.7135 | 3.7136 | 3.7137 | 3.7137 | 3.7138 | 3.7139 | 3.7140 | 3.7141 | 3.7142 | 3.7142 |
| | 26 | 20 | 3.7143 | 3.7144 | 3.7145 | 3.7146 | 3.7147 | 3.7147 | 3.7148 | 3.7149 | 3.7150 | 3.7151 |
| | 26 | 30 | 3.7152 | 3.7153 | 3.7153 | 3.7154 | 3.7155 | 3.7156 | 3.7157 | 3.7158 | 3.7159 | 3.7159 |
| | 26 | 40 | 3.7160 | 3.7161 | 3.7162 | 3.7163 | 3.7163 | 3.7164 | 3.7165 | 3.7166 | 3.7167 | 3.7168 |
| | 26 | 50 | 3.7168 | 3.7169 | 3.7170 | 3.7171 | 3.7172 | 3.7173 | 3.7173 | 3.7174 | 3.7175 | 3.7176 |
| 1 | 27 | 0 | 3.7177 | 3.7178 | 3.7178 | 3.7179 | 3.7180 | 3.7181 | 3.7182 | 3.7183 | 3.7183 | 3.7184 |
| | 27 | 10 | 3.7185 | 3.7186 | 3.7187 | 3.7188 | 3.7188 | 3.7189 | 3.7190 | 3.7191 | 3.7192 | 3.7192 |
| | 27 | 20 | 3.7193 | 3.7194 | 3.7195 | 3.7196 | 3.7197 | 3.7197 | 3.7198 | 3.7199 | 3.7200 | 3.7201 |
| | 27 | 30 | 3.7202 | 3.7202 | 3.7203 | 3.7204 | 3.7205 | 3.7206 | 3.7207 | 3.7207 | 3.7208 | 3.7209 |
| | 27 | 40 | 3.7210 | 3.7211 | 3.7212 | 3.7212 | 3.7213 | 3.7214 | 3.7215 | 3.7216 | 3.7216 | 3.7217 |
| | 27 | 50 | 3.7218 | 3.7219 | 3.7220 | 3.7221 | 3.7221 | 3.7222 | 3.7223 | 3.7224 | 3.7225 | 3.7226 |
| 1 | 28 | 0 | 3.7226 | 3.7227 | 3.7228 | 3.7229 | 3.7230 | 3.7230 | 3.7231 | 3.7232 | 3.7233 | 3.7234 |
| | 28 | 10 | 3.7235 | 3.7235 | 3.7236 | 3.7237 | 3.7238 | 3.7239 | 3.7239 | 3.7240 | 3.7241 | 3.7242 |
| | 28 | 20 | 3.7243 | 3.7244 | 3.7244 | 3.7245 | 3.7246 | 3.7247 | 3.7248 | 3.7248 | 3.7249 | 3.7250 |
| | 28 | 30 | 3.7251 | 3.7252 | 3.7253 | 3.7253 | 3.7254 | 3.7255 | 3.7256 | 3.7257 | 3.7257 | 3.7258 |
| | 28 | 40 | 3.7259 | 3.7260 | 3.7261 | 3.7262 | 3.7262 | 3.7263 | 3.7264 | 3.7265 | 3.7266 | 3.7266 |
| | 28 | 50 | 3.7267 | 3.7268 | 3.7269 | 3.7270 | 3.7271 | 3.7271 | 3.7272 | 3.7273 | 3.7274 | 3.7275 |
| 1 | 29 | 0 | 3.7275 | 3.7276 | 3.7277 | 3.7278 | 3.7279 | 3.7279 | 3.7280 | 3.7281 | 3.7282 | 3.7283 |
| | 29 | 10 | 3.7284 | 3.7284 | 3.7285 | 3.7286 | 3.7287 | 3.7288 | 3.7288 | 3.7289 | 3.7290 | 3.7291 |
| | 29 | 20 | 3.7292 | 3.7292 | 3.7293 | 3.7294 | 3.7295 | 3.7296 | 3.7297 | 3.7297 | 3.7298 | 3.7299 |
| | 29 | 30 | 3.7300 | 3.7301 | 3.7301 | 3.7302 | 3.7303 | 3.7304 | 3.7305 | 3.7305 | 3.7306 | 3.7307 |
| | 29 | 40 | 3.7308 | 3.7309 | 3.7309 | 3.7310 | 3.7311 | 3.7312 | 3.7313 | 3.7313 | 3.7314 | 3.7315 |
| | 29 | 50 | 3.7316 | 3.7317 | 3.7317 | 3.7318 | 3.7319 | 3.7320 | 3.7321 | 3.7322 | 3.7322 | 3.7323 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° | ′ | ″ | | | | | | | | | | |
| 1h | 30m | 0s | 3.7324 | 3.7325 | 3.7326 | 3.7326 | 3.7327 | 3.7328 | 3.7329 | 3.7330 | 3.7330 | 3.7331 |
| | 30 | 10 | 3.7332 | 3.7333 | 3.7334 | 3.7334 | 3.7335 | 3.7336 | 3.7337 | 3.7338 | 3.7338 | 3.7339 |
| | 30 | 20 | 3.7340 | 3.7341 | 3.7342 | 3.7342 | 3.7343 | 3.7344 | 3.7345 | 3.7346 | 3.7346 | 3.7347 |
| | 30 | 30 | 3.7348 | 3.7349 | 3.7350 | 3.7350 | 3.7351 | 3.7352 | 3.7353 | 3.7354 | 3.7354 | 3.7355 |
| | 30 | 40 | 3.7356 | 3.7357 | 3.7358 | 3.7358 | 3.7359 | 3.7360 | 3.7361 | 3.7362 | 3.7362 | 3.7363 |
| | 30 | 50 | 3.7364 | 3.7365 | 3.7366 | 3.7366 | 3.7367 | 3.7368 | 3.7369 | 3.7370 | 3.7370 | 3.7371 |
| 1 | 31 | 0 | 3.7372 | 3.7373 | 3.7374 | 3.7374 | 3.7375 | 3.7376 | 3.7377 | 3.7377 | 3.7378 | 3.7379 |
| | 31 | 10 | 3.7380 | 3.7381 | 3.7381 | 3.7382 | 3.7383 | 3.7384 | 3.7385 | 3.7385 | 3.7386 | 3.7387 |
| | 31 | 20 | 3.7388 | 3.7389 | 3.7389 | 3.7390 | 3.7391 | 3.7392 | 3.7393 | 3.7393 | 3.7394 | 3.7395 |
| | 31 | 30 | 3.7396 | 3.7397 | 3.7397 | 3.7398 | 3.7399 | 3.7400 | 3.7400 | 3.7401 | 3.7402 | 3.7403 |
| | 31 | 40 | 3.7404 | 3.7404 | 3.7405 | 3.7406 | 3.7407 | 3.7408 | 3.7408 | 3.7409 | 3.7410 | 3.7411 |
| | 31 | 50 | 3.7412 | 3.7412 | 3.7413 | 3.7414 | 3.7415 | 3.7415 | 3.7416 | 3.7417 | 3.7418 | 3.7419 |
| 1 | 32 | 0 | 3.7419 | 3.7420 | 3.7421 | 3.7422 | 3.7423 | 3.7423 | 3.7424 | 3.7425 | 3.7426 | 3.7426 |
| | 32 | 10 | 3.7427 | 3.7428 | 3.7429 | 3.7430 | 3.7430 | 3.7431 | 3.7432 | 3.7433 | 3.7434 | 3.7434 |
| | 32 | 20 | 3.7435 | 3.7436 | 3.7437 | 3.7437 | 3.7438 | 3.7439 | 3.7440 | 3.7441 | 3.7441 | 3.7442 |
| | 32 | 30 | 3.7443 | 3.7444 | 3.7444 | 3.7445 | 3.7446 | 3.7447 | 3.7448 | 3.7448 | 3.7449 | 3.7450 |
| | 32 | 40 | 3.7451 | 3.7452 | 3.7452 | 3.7453 | 3.7454 | 3.7455 | 3.7455 | 3.7456 | 3.7457 | 3.7458 |
| | 32 | 50 | 3.7459 | 3.7459 | 3.7460 | 3.7461 | 3.7462 | 3.7462 | 3.7463 | 3.7464 | 3.7465 | 3.7466 |
| 1 | 33 | 0 | 3.7466 | 3.7467 | 3 7468 | 3.7469 | 3.7469 | 3.7470 | 3.7471 | 3.7472 | 3.7473 | 3.7473 |
| | 33 | 10 | 3.7474 | 3.7475 | 3.7476 | 3.7476 | 3.7477 | 3.7478 | 3.7479 | 3.7480 | 3.7480 | 3.7481 |
| | 33 | 20 | 3.7482 | 3.7483 | 3.7483 | 3.7484 | 3.7485 | 3.7486 | 3.7487 | 3.7487 | 3.7488 | 3.7489 |
| | 33 | 30 | 3.7490 | 3.7490 | 3.7491 | 3.7492 | 3.7493 | 3.7493 | 3.7494 | 3.7495 | 3.7496 | 3.7497 |
| | 33 | 40 | 3.7497 | 3.7498 | 3.7499 | 3.7500 | 3.7500 | 3.7501 | 3.7502 | 3.7503 | 3.7504 | 3.7504 |
| | 33 | 50 | 3.7505 | 3.7506 | 3.7507 | 3.7507 | 3.7508 | 3.7509 | 3.7510 | 3.7510 | 3.7511 | 3.7512 |
| 1 | 34 | 0 | 3.7513 | 3.7514 | 3.7514 | 3.7515 | 3.7516 | 3.7517 | 3.7517 | 3.7518 | 3.7519 | 3.7520 |
| | 34 | 10 | 3.7520 | 3.7521 | 3.7522 | 3.7523 | 3.7524 | 3.7524 | 3.7525 | 3.7526 | 3.7527 | 3.7527 |
| | 34 | 20 | 3.7528 | 3.7529 | 3.7530 | 3.7530 | 3.7531 | 3.7532 | 3.7533 | 3.7534 | 3.7534 | 3.7535 |
| | 34 | 30 | 3.7536 | 3.7537 | 3.7537 | 3.7538 | 3.7539 | 3.7540 | 3.7540 | 3.7541 | 3.7542 | 3.7543 |
| | 34 | 40 | 3.7543 | 3.7544 | 3.7545 | 3.7546 | 3.7547 | 3.7547 | 3.7548 | 3.7549 | 3.7550 | 3.7550 |
| | 34 | 50 | 3.7551 | 3.7552 | 3.7553 | 3.7553 | 3.7554 | 3.7555 | 3.7556 | 3.7556 | 3.7557 | 3.7558 |
| 1 | 35 | 0 | 3.7559 | 3.7560 | 3.7560 | 3.7561 | 3.7562 | 3.7563 | 3.7563 | 3.7564 | 3.7565 | 3.7566 |
| | 35 | 10 | 3.7566 | 3.7567 | 3.7568 | 3.7569 | 3.7569 | 3.7570 | 3.7571 | 3.7572 | 3.7572 | 3.7573 |
| | 35 | 20 | 3.7574 | 3.7575 | 3.7575 | 3.7576 | 3.7577 | 3.7578 | 3.7579 | 3.7579 | 3.7580 | 3.7581 |
| | 35 | 30 | 3.7582 | 3.7582 | 3.7583 | 3.7584 | 3.7585 | 3.7585 | 3.7586 | 3.7587 | 3.7588 | 3.7588 |
| | 35 | 40 | 3.7589 | 3.7590 | 3.7591 | 3.7591 | 3.7592 | 3.7593 | 3.7594 | 3.7594 | 3.7595 | 3.7596 |
| | 35 | 50 | 3.7597 | 3.7597 | 3.7598 | 3.7599 | 3.7600 | 3.7600 | 3.7601 | 3.7602 | 3.7603 | 3.7603 |
| 1 | 36 | 0 | 3.7604 | 3.7605 | 3.7606 | 3.7606 | 3.7607 | 3.7608 | 3.7609 | 3.7609 | 3.7610 | 3.7611 |
| | 36 | 10 | 3.7612 | 3.7613 | 3.7613 | 3.7614 | 3.7615 | 3.7616 | 3.7616 | 3.7617 | 3.7618 | 3.7619 |
| | 36 | 20 | 3.7619 | 3.7620 | 3.7621 | 3.7622 | 3.7622 | 3.7623 | 3.7624 | 3.7625 | 3.7625 | 3.7626 |
| | 36 | 30 | 3.7627 | 3.7628 | 3.7628 | 3.7629 | 3.7630 | 3.7631 | 3.7631 | 3.7632 | 3.7633 | 3.7634 |
| | 36 | 40 | 3.7634 | 3.7635 | 3.7636 | 3.7637 | 3.7637 | 3.7638 | 3.7639 | 3.7640 | 3.7640 | 3.7641 |
| | 36 | 50 | 3.7642 | 3.7643 | 3.7643 | 3.7644 | 3.7645 | 3.7645 | 3.7646 | 3.7647 | 3.7648 | 3.7648 |
| 1 | 37 | 0 | 3.7649 | 3.7650 | 3.7651 | 3.7651 | 3.7652 | 3.7653 | 3.7654 | 3.7654 | 3.7655 | 3.7656 |
| | 37 | 10 | 3.7657 | 3.7657 | 3.7658 | 3.7659 | 3.7660 | 3.7660 | 3.7661 | 3.7662 | 3.7663 | 3.7663 |
| | 37 | 20 | 3.7664 | 3.7665 | 3.7666 | 3.7666 | 3.7667 | 3.7668 | 3.7669 | 3.7669 | 3.7670 | 3.7671 |
| | 37 | 30 | 3.7672 | 3.7672 | 3.7673 | 3.7674 | 3.7675 | 3.7675 | 3.7676 | 3.7677 | 3.7677 | 3.7678 |
| | 37 | 40 | 3.7679 | 3.7680 | 3.7681 | 3.7681 | 3.7682 | 3.7683 | 3.7683 | 3.7684 | 3.7685 | 3.7686 |
| | 37 | 50 | 3.7686 | 3.7687 | 3.7688 | 3.7689 | 3.7689 | 3.7690 | 3.7691 | 3.7692 | 3.7692 | 3.7693 |
| 1 | 38 | 0 | 3.7694 | 3.7695 | 3.7695 | 3.7696 | 3.7697 | 3.7697 | 3.7698 | 3.7699 | 3.7700 | 3.7700 |
| | 38 | 10 | 3.7701 | 3.7702 | 3.7703 | 3.7703 | 3.7704 | 3.7705 | 3.7706 | 3.7706 | 3.7707 | 3.7708 |
| | 38 | 20 | 3.7709 | 3.7709 | 3.7710 | 3.7711 | 3.7711 | 3.7712 | 3.7713 | 3.7714 | 3.7714 | 3.7715 |
| | 38 | 30 | 3.7716 | 3.7717 | 3.7717 | 3.7718 | 3.7719 | 3.7720 | 3.7720 | 3.7721 | 3.7722 | 3.7722 |
| | 38 | 40 | 3.7723 | 3.7724 | 3.7725 | 3.7725 | 3.7726 | 3.7727 | 3.7728 | 3.7728 | 3.7729 | 3.7730 |
| | 38 | 50 | 3.7731 | 3.7731 | 3.7732 | 3.7733 | 3.7733 | 3.7734 | 3.7735 | 3.7736 | 3.7736 | 3.7737 |
| 1 | 39 | 0 | 3.7738 | 3.7739 | 3.7739 | 3.7740 | 3.7741 | 3.7742 | 3.7742 | 3.7743 | 3.7744 | 3.7744 |
| | 39 | 10 | 3.7745 | 3.7746 | 3.7747 | 3.7747 | 3.7748 | 3.7749 | 3.7750 | 3.7750 | 3.7751 | 3.7752 |
| | 39 | 20 | 3.7752 | 3.7753 | 3.7754 | 3.7755 | 3.7755 | 3.7756 | 3.7757 | 3.7758 | 3.7758 | 3.7759 |
| | 39 | 30 | 3.7760 | 3.7760 | 3.7761 | 3.7762 | 3.7763 | 3.7763 | 3.7764 | 3.7765 | 3.7766 | 3.7766 |
| | 39 | 40 | 3.7767 | 3.7768 | 3.7768 | 3.7769 | 3.7770 | 3.7771 | 3.7771 | 3.7772 | 3.7773 | 3.7774 |
| | 39 | 50 | 3.7774 | 3.7775 | 3.7776 | 3.7776 | 3.7777 | 3.7778 | 3.7779 | 3.7779 | 3.7780 | 3.7781 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $1^{h.}\ 0^{m.}\ 0^{s.}$ | 3.7782 | 3.7782 | 3.7783 | 3.7784 | 3.7784 | 3.7785 | 3.7786 | 3.7787 | 3.7787 | 3.7788 |
| 40 10 | 3.7789 | 3.7789 | 3.7790 | 3.7791 | 3.7792 | 3.7792 | 3.7793 | 3.7794 | 3.7795 | 3.7795 |
| 40 20 | 3.7796 | 3.7797 | 3.7797 | 3.7798 | 3.7799 | 3.7800 | 3.7800 | 3.7801 | 3.7802 | 3.7802 |
| 40 30 | 3.7803 | 3.7804 | 3.7805 | 3.7805 | 3.7806 | 3.7807 | 3.7807 | 3.7808 | 3.7809 | 3.7810 |
| 40 40 | 3.7810 | 3.7811 | 3.7812 | 3.7813 | 3.7813 | 3.7814 | 3.7815 | 3.7815 | 3.7816 | 3.7817 |
| 40 50 | 3.7818 | 3.7818 | 3.7819 | 3.7820 | 3.7820 | 3.7821 | 3.7822 | 3.7823 | 3.7823 | 3.7824 |
| 1 41 0 | 3.7825 | 3.7825 | 3.7826 | 3.7827 | 3.7828 | 3.7828 | 3.7829 | 3.7830 | 3.7830 | 3.7831 |
| 41 10 | 3.7832 | 3.7833 | 3.7833 | 3.7834 | 3.7835 | 3.7835 | 3.7836 | 3.7837 | 3.7838 | 3.7838 |
| 41 20 | 3.7839 | 3.7840 | 3.7840 | 3.7841 | 3.7842 | 3.7843 | 3.7843 | 3.7844 | 3.7845 | 3.7845 |
| 41 30 | 3.7846 | 3.7847 | 3.7848 | 3.7848 | 3.7849 | 3.7850 | 3.7850 | 3.7851 | 3.7852 | 3.7853 |
| 41 40 | 3.7853 | 3.7854 | 3.7855 | 3.7855 | 3.7856 | 3.7857 | 3.7858 | 3.7858 | 3.7859 | 3.7860 |
| 41 50 | 3.7860 | 3.7861 | 3.7862 | 3 7863 | 3.7863 | 3.7864 | 3.7865 | 3.7865 | 3.7866 | 3.7867 |
| 1 42 0 | 3.7868 | 3.7868 | 3.7869 | 3.7870 | 3.7870 | 3.7871 | 3.7872 | 3.7872 | 3.7873 | 3.7874 |
| 42 10 | 3.7875 | 3.7875 | 3.7876 | 3.7877 | 3.7877 | 3.7878 | 3.7879 | 3.7880 | 3.7880 | 3.7881 |
| 42 20 | 3.7882 | 3.7882 | 3.7883 | 3.7884 | 3.7885 | 3.7885 | 3.7886 | 3.7887 | 3.7887 | 3.7888 |
| 42 30 | 3.7889 | 3.7889 | 3.7890 | 3.7891 | 3.7892 | 3.7892 | 3.7893 | 3.7894 | 3.7894 | 3.7895 |
| 42 40 | 3.7896 | 3.7897 | 3.7897 | 3.7898 | 3.7899 | 3.7899 | 3.7900 | 3.7901 | 3.7901 | 3.7902 |
| 42 50 | 3.7903 | 3.7904 | 3.7904 | 3.7905 | 3.7906 | 3.7906 | 3.7907 | 3.7908 | 3.7908 | 3.7909 |
| 1 43 0 | 3.7910 | 3.7911 | 3.7911 | 3.7912 | 3.7913 | 3.7913 | 3.7914 | 3 7915 | 3.7916 | 3.7916 |
| 43 10 | 3.7917 | 3.7918 | 3.7918 | 3.7919 | 3.7920 | 3.7920 | 3.7921 | 3.7922 | 3.7923 | 3.7923 |
| 43 20 | 3.7924 | 3.7925 | 3.7925 | 3.7926 | 3.7927 | 3.7927 | 3.7928 | 3.7929 | 3.7930 | 3.7930 |
| 43 30 | 3.7931 | 3.7932 | 3.7932 | 3.7933 | 3.7934 | 3.7934 | 3.7935 | 3.7936 | 3.7937 | 3.7937 |
| 43 40 | 3.7938 | 3.7939 | 3.7939 | 3.7940 | 3.7941 | 3.7941 | 3.7942 | 3.7943 | 3.7943 | 3.7944 |
| 43 50 | 3.7945 | 3.7946 | 3.7946 | 3.7947 | 3.7948 | 3.7948 | 3.7949 | 3.7950 | 3.7950 | 3.7951 |
| 1 44 0 | 3.7952 | 3.7953 | 3.7953 | 3.7954 | 3.7955 | 3.7955 | 3.7956 | 3.7957 | 3.7957 | 3.7958 |
| 44 10 | 3.7959 | 3.7959 | 3.7960 | 3.7961 | 3.7962 | 3.7962 | 3.7963 | 3.7964 | 3.7964 | 3.7965 |
| 44 20 | 3.7966 | 3.7966 | 3.7967 | 3.7968 | 3.7969 | 3.7969 | 3.7970 | 3.7971 | 3.7971 | 3.7972 |
| 44 30 | 3.7973 | 3.7973 | 3.7974 | 3.7975 | 3.7975 | 3.7976 | 3.7977 | 3.7978 | 3.7978 | 3.7979 |
| 44 40 | 3.7980 | 3.7980 | 3.7981 | 3.7982 | 3.7982 | 3 7983 | 3.7984 | 3.7984 | 3.7985 | 3.7986 |
| 44 50 | 3.7987 | 3.7987 | 3.7988 | 3.7989 | 3.7989 | 3.7990 | 3.7991 | 3.7991 | 3.7992 | 3.7993 |
| 1 45 0 | 3.7993 | 3.7994 | 3.7995 | 3.7995 | 3.7996 | 3.7997 | 3.7998 | 3.7998 | 3.7999 | 3.8000 |
| 45 10 | 3.8000 | 3.8001 | 3.8002 | 3.8002 | 3.8003 | 3.8004 | 3.8004 | 3.8005 | 3.8006 | 3.8006 |
| 45 20 | 3.8007 | 3.8008 | 3.8009 | 3.8009 | 3.8010 | 3.8011 | 3.8011 | 3.8012 | 3.8013 | 3.8013 |
| 45 30 | 3.8014 | 3.8015 | 3.8015 | 3.8016 | 3.8017 | 3.8017 | 3.8018 | 3.8019 | 3.8020 | 3.8020 |
| 45 40 | 3.8021 | 3.8022 | 3.8022 | 3.8023 | 3.8024 | 3.8024 | 3.8025 | 3.8026 | 3.8026 | 3.8027 |
| 45 50 | 3.8028 | 3.8028 | 3.8029 | 3.8030 | 3.8030 | 3.8031 | 3.8032 | 3.8033 | 3.8033 | 3.8034 |
| 1 46 0 | 3.8035 | 3.8035 | 3.8036 | 3.8036 | 3.8037 | 3.8038 | 3.8039 | 3.8039 | 3.8040 | 3.8041 |
| 46 10 | 3.8041 | 3.8042 | 3.8043 | 3.8043 | 3.8044 | 3.8045 | 3.8045 | 3.8046 | 3.8047 | 3.8048 |
| 46 20 | 3.8048 | 3.8049 | 3.8050 | 3.8050 | 3.8051 | 3.8052 | 3.8052 | 3.8053 | 3.8054 | 3.8054 |
| 46 30 | 3.8055 | 3.8056 | 3.8056 | 3.8057 | 3.8058 | 3.8058 | 3.8059 | 3.8060 | 3.8060 | 3.8061 |
| 46 40 | 3.8062 | 3.8062 | 3.8063 | 3.8064 | 3.8065 | 3.8065 | 3.8066 | 3.8067 | 3.8067 | 3.8068 |
| 46 50 | 3.8069 | 3.8069 | 3.8070 | 3.8071 | 3.8071 | 3.8072 | 3.8073 | 3.8073 | 3.8074 | 3.8075 |
| 1 47 0 | 3.8075 | 3.8076 | 3.8077 | 3.8077 | 3.8078 | 3.8079 | 3.8079 | 3.8080 | 3.8081 | 3.8081 |
| 47 10 | 3.8082 | 3.8083 | 3.8083 | 3.8084 | 3.8085 | 3.8085 | 3.8086 | 3.8087 | 3.8088 | 3.8088 |
| 47 20 | 3.8089 | 3.8090 | 3.8090 | 3.8091 | 3.8092 | 3.8092 | 3.8093 | 3.8094 | 3.8094 | 3.8095 |
| 47 30 | 3.8096 | 3.8096 | 3.8097 | 3.8098 | 3.8098 | 3.8099 | 3.8099 | 3.8100 | 3.8101 | 3.8102 |
| 47 40 | 3.8102 | 3.8103 | 3.8104 | 3.8104 | 3.8105 | 3.8106 | 3.8106 | 3.8107 | 3.8108 | 3.8108 |
| 47 50 | 3.8109 | 3.8110 | 3.8110 | 3.8111 | 3.8112 | 3.8112 | 3.8113 | 3.8114 | 3.8114 | 3.8115 |
| 1 48 0 | 3.8116 | 3.8116 | 3.8117 | 3.8118 | 3.8118 | 3.8119 | 3.8120 | 3.8120 | 3.8121 | 3.8122 |
| 48 10 | 3.8122 | 3.8123 | 3.8124 | 3.8124 | 3.8125 | 3.8126 | 3.8126 | 3.8127 | 3.8128 | 3.8128 |
| 48 20 | 3.8129 | 3.8130 | 3.8130 | 3.8131 | 3.8132 | 3.8132 | 3.8133 | 3.8134 | 3.8134 | 3.8135 |
| 48 30 | 3.8136 | 3.8136 | 3.8137 | 3.8138 | 3.8138 | 3.8139 | 3.8140 | 3.8140 | 3.8141 | 3.8142 |
| 48 40 | 3.8142 | 3.8143 | 3.8144 | 3.8144 | 3.8145 | 3.8146 | 3.8146 | 3.8147 | 3.8148 | 3.8148 |
| 48 50 | 3.8149 | 3.8150 | 3.8150 | 3.8151 | 3.8152 | 3.8152 | 3.8153 | 3.8154 | 3.8154 | 3.8155 |
| 1 49 0 | 3.8156 | 3.8156 | 3.8157 | 3.8158 | 3.8158 | 3.8159 | 3.8160 | 3.8160 | 3.8161 | 3.8162 |
| 49 10 | 3.8162 | 3.8163 | 3.8164 | 3.8164 | 3.8165 | 3.8166 | 3.8166 | 3.8167 | 3.8168 | 3.8168 |
| 49 20 | 3.8169 | 3.8170 | 3.8170 | 3.8171 | 3.8172 | 3.8172 | 3.8173 | 3.8174 | 3.8174 | 3.8175 |
| 49 30 | 3.8176 | 3.8176 | 3.8177 | 3.8178 | 3.8178 | 3.8179 | 3.8180 | 3.8180 | 3.8181 | 3.8182 |
| 49 40 | 3.8182 | 3.8183 | 3.8184 | 3.8184 | 3.8185 | 3.8185 | 3 8186 | 3.8187 | 3.8188 | 3.8188 |
| 49 50 | 3.8189 | 3.8190 | 3.8190 | 3.8191 | 3.8191 | 3.8192 | 3.8193 | 3.8193 | 3.8194 | 3.8195 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5 | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1h. 50m. 0s. | 3.8195 | 3.8196 | 3.8197 | 3.8197 | 3.8198 | 3.8199 | 3.8199 | 3.8200 | 3.8201 | 3.8201 |
| 50 10 | 3.8202 | 3.8203 | 3.8203 | 3.8204 | 3.8205 | 3.8205 | 3.8206 | 3.8207 | 3.8207 | 3.8208 |
| 50 20 | 3.8209 | 3.8209 | 3.8210 | 3.8211 | 3.8211 | 3.8212 | 3.8213 | 3.8213 | 3.8214 | 3.8214 |
| 50 30 | 3.8215 | 3.8216 | 3.8216 | 3.8217 | 3.8218 | 3.8218 | 3.8219 | 3.8220 | 3.8220 | 3.8221 |
| 50 40 | 3.8222 | 3.8222 | 3.8223 | 3.8224 | 3.8224 | 3.8225 | 3.8226 | 3.8226 | 3.8227 | 3.8228 |
| 50 50 | 3.8228 | 3.8229 | 3.8230 | 3.8230 | 3.8231 | 3.8231 | 3.8232 | 3.8233 | 3.8233 | 3.8234 |
| 1 51 0 | 3.8235 | 3.8235 | 3.8236 | 3.8237 | 3.8237 | 3.8238 | 3.8239 | 3.8239 | 3 8240 | 3.8241 |
| 51 10 | 3.8241 | 3.8242 | 3.8243 | 3.8243 | 3.8244 | 3.8245 | 3.8245 | 3.8246 | 3.8246 | 3.8247 |
| 51 .20 | 3.8248 | 3.8248 | 3.8249 | 3.8250 | 3.8250 | 3.8251 | 3.8252 | 3.8252 | 3.8253 | 3.8254 |
| 51 30 | 3.8254 | 3.8255 | 3.8256 | 3.8256 | 3.8257 | 3.8258 | 3.8258 | 3.8259 | 3.8259 | 3.8260 |
| 51 40 | 3.8261 | 3.8261 | 3.8262 | 3.8263 | 3.8263 | 3.8264 | 3.8265 | 3.8265 | 3.8266 | 3.8267 |
| 51 50 | 3.8267 | 3.8268 | 3.8269 | 3.8269 | 3.8270 | 3.8270 | 3.8271 | 3.8272 | 3.8272 | 3.8273 |
| 1 52 0 | 3.8274 | 3.8274 | 3.8275 | 3.8276 | 3.8276 | 3.8277 | 3.8278 | 3.8278 | 3.8279 | 3.8280 |
| 52 10 | 3.8280 | 3.8281 | 3.8281 | 3.8282 | 3.8283 | 3.8283 | 3.8284 | 3.8285 | 3.8285 | 3.8286 |
| 52 20 | 3.8287 | 3.8287 | 3.8288 | 3.8289 | 3.8289 | 3.8290 | 3.8290 | 3.8291 | 3.8292 | 3.8292 |
| 52 30 | 3.8293 | 3.8294 | 3.8294 | 3.8295 | 3.8296 | 3.8296 | 3.8297 | 3.8298 | 3.8298 | 3.8299 |
| 52 40 | 3.8299 | 3.8300 | 3.8301 | 3.8301 | 3.8302 | 3.8303 | 3.8303 | 3.8304 | 3.8305 | 3.8305 |
| 52 50 | 3.8306 | 3.8307 | 3.8307 | 3.8308 | 3.8308 | 3.8309 | 3.8310 | 3.8310 | 3.8311 | 3.8312 |
| 1 53 0 | 3.8312 | 3.8313 | 3.8314 | 3.8314 | 3.8315 | 3.8315 | 3.8316 | 3.8317 | 3.8317 | 3.8318 |
| 53 10 | 3.8319 | 3.8319 | 3.8320 | 3.8321 | 3.8321 | 3.8322 | 3.8323 | 3.8323 | 3.8324 | 3.8324 |
| 53 20 | 3.8325 | 3.8326 | 3 8326 | 3.8327 | 3.8328 | 3.8328 | 3.8329 | 3.8330 | 3.8330 | 3.8331 |
| 53 30 | 3.8331 | 3.8332 | 3.8333 | 3.8333 | 3.8334 | 3.8335 | 3.8335 | 3.8336 | 3.8337 | 3.8337 |
| 53 40 | 3.8338 | 3.8338 | 3.8339 | 3.8340 | 3.8340 | 3.8341 | 3.8342 | 3.8342 | 3.8343 | 3.8344 |
| 53 50 | 3.8344 | 3 8345 | 3.8345 | 3.8346 | 3.8347 | 3.8347 | 3.8348 | 3.8349 | 3.8349 | 3.8350 |
| 1 54 ·0 | 3.8351 | 3.8351 | 3.8352 | 3.8352 | 3.8353 | 3.8354 | 3.8354 | 3.8355 | 3.8356 | 3.8356 |
| 54 10 | 3.8357 | 3.8358 | 3.8358 | 3.8359 | 3.8359 | 3.8360 | 3.8361 | 3.8361 | 3.8362 | 3.8363 |
| 54 20 | 3.8363 | 3.8364 | 3.8365 | 3.8365 | 3.8366 | 3.8366 | 3.8367 | 3.8368 | 3.8368 | 3.8369 |
| 54 30 | 3.8370 | 3.8370 | 3.8371 | 3.8371 | 3.8372 | 3.8373 | 3.8373 | 3.8374 | 3.8375 | 3.8375 |
| 54 40 | 3.8376 | 3.8377 | 3.8377 | 3.8378 | 3.8378 | 3.8379 | 3.8380 | 3.8380 | 3.8381 | 3.8382 |
| 54 50 | 3.8382 | 3.8383 | 3.8383 | 3.8384 | 3.8385 | 3.8385 | 3.8386 | 3.8387 | 3.8387 | 3.8388 |
| 1 55 0 | 3.8388 | 3.8389 | 3.8390 | 3.8390 | 3.8391 | 3.8392 | 3.8392 | 3.8393 | 3.8394 | 3.8394 |
| 55 10 | 3.8395 | 3.8395 | 3.8396 | 3.8397 | 3.8397 | 3.8398 | 3.8399 | 3.8399 | 3.8400 | 3.8400 |
| 55 20 | 3.8401 | 3.8402 | 3.8402 | 3.8403 | 3.8404 | 3.8404 | 3.8405 | 3.8405 | 3.8406 | 3.8407 |
| 55 30 | 3.8407 | 3.8408 | 3.8409 | 3.8409 | 3.8410 | 3.8410 | 3.8411 | 3.8412 | 3.8412 | 3.8413 |
| 55 40 | 3.8414 | 3.8414 | 3.8415 | 3.8415 | 3.8416 | 3.8417 | 3.8417 | 3.8418 | 3.8419 | 3.8419 |
| 55 50 | 3.8420 | 3.8420 | 3.8421 | 3.8422 | 3.8422 | 3.8423 | 3.8424 | 3.8424 | 3.8425 | 3.8425 |
| 1 56 0 | 3.8426 | 3.8427 | 3.8427 | 3.8428 | 3.8429 | 3.8429 | 3.8430 | 3.8430 | 3.8431 | 3.8432 |
| 56 10 | 3.8432 | 3.8433 | 3.8434 | 3.8434 | 3.8435 | 3.8435 | 3.8436 | 3.8437 | 3.8437 | 3.8438 |
| 56 20 | 3.8439 | 3.8439 | 3.8440 | 3.8440 | 3.8441 | 3.8442 | 3.8442 | 3.8443 | 3.8444 | 3.8444 |
| 56 30 | 3.8445 | 3.8445 | 3.8446 | 3.8447 | 3.8447 | 3.8448 | 3.8448 | 3.8449 | 3.8450 | 3.8450 |
| 56 40 | 3.8451 | 3.8452 | 3.8452 | 3.8453 | 3.8453 | 3.8454 | 3.8455 | 3.8455 | 3.8456 | 3.8457 |
| 56 50 | 3.8457 | 3.8458 | 3.8458 | 3.8459 | 3.8460 | 3.8460 | 3.8461 | 3.8462 | 3.8462 | 3.8463 |
| 1 57 0 | 3.8463 | 3.8464 | 3.8465 | 3.8465 | 3.8466 | 3.8466 | 3.8467 | 3.8468 | 3.8468 | 3.8469 |
| 57 10 | 3.8470 | 3.8470 | 3.8471 | 3.8471 | 3.8472 | 3.8473 | 3.8473 | 3.8474 | 3.8474 | 3.8475 |
| 57 20 | 3.8476 | 3.8476 | 3.8477 | 3.8478 | 3.8478 | 3.8479 | 3.8479 | 3.8480 | 3.8481 | 3.8481 |
| 57 30 | 3.8482 | 3.8483 | 3.8483 | 3.8484 | 3.8484 | 3.8485 | 3.8486 | 3.8486 | 3.8487 | 3.8487 |
| 57 40 | 3.8488 | 3.8489 | 3.8489 | 3.8490 | 3.8491 | 3.8491 | 3.8492 | 3.8492 | 3.8493 | 3.8494 |
| 57 50 | 3.8494 | 3 8495 | 3.8495 | 3.8496 | 3.8497 | 3.8497 | 3.8498 | 3.8499 | 3.8499 | 3.8500 |
| 1 58 0 | 3.8500 | 3.8501 | 3.8502 | 3.8502 | 3.8503 | 3.8503 | 3.8504 | 3.8505 | 3.8505 | 3.8506 |
| 58 10 | 3.8506 | 3.8507 | 3.8508 | 3.8508 | 3.8509 | 3.8510 | 3.8510 | 3.8511 | 3.8511 | 3.8512 |
| 58 20 | 3.8513 | 3.8513 | 3.8514 | 3.8514 | 3.8515 | 3.8516 | 3.8516 | 3.8517 | 3.8517 | 3.8518 |
| 58 30 | 3.8519 | 3.8519 | 3.8520 | 3.8521 | 3.8521 | 3.8522 | 3.8522 | 3.8523 | 3.8524 | 3.8524 |
| 58 40 | 3.8525 | 3.8525 | 3.8526 | 3.8527 | 3.8527 | 3.8528 | 3.8528 | 3.8529 | 3.8530 | 3.8530 |
| 58 50 | 3.8531 | 3.8532 | 3.8532 | 3.8533 | 3.8533 | 3.8534 | 3.8535 | 3.8535 | 3.8536 | 3.8536 |
| 1 59 0 | 3.8537 | 3.8538 | 3.8538 | 3.8539 | 3.8539 | 3.8540 | 3.8541 | 3.8541 | 3.8542 | 3.8542 |
| 59 10 | 3.8543 | 3.8544 | 3.8544 | 3.8545 | 3.8545 | 3.8546 | 3.8547 | 3.8547 | 3.8548 | 3.8549 |
| 59 20 | 3.8549 | 3.8550 | 3.8550 | 3.8551 | 3.8552 | 3.8552 | 3.8553 | 3.8553 | 3.8554 | 3.8555 |
| 59 30 | 3.8555 | 3.8556 | 3.8556 | 3.8557 | 3.8558 | 3.8558 | 3.8559 | 3.8559 | 3.8560 | 3.8561 |
| 59 40 | 3 8561 | 3.8562 | 3 8562 | 3.8563 | 3.8564 | 3.8564 | 3.8565 | 3.8565 | 3.8566 | 3.8567 |
| 59 50 | 3.8567 | 3.8568 | 3.8568 | 3.8569 | 3.8570 | 3.8570 | 3.8571 | 3.8572 | 3.8572 | 3.8573 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| °<br>2h. | ′<br>0m. | ″<br>0s. | 3.8573 | 3.8574 | 3.8575 | 3.8575 | 3.8576 | 3.8576 | 3.8577 | 3.8578 | 3.8578 | 3.8579 |
| | 0 | 10 | 3.8579 | 3.8580 | 3.8581 | 3.8581 | 3.8582 | 3.8582 | 3.8583 | 3.8584 | 3.8584 | 3.8585 |
| | 0 | 20 | 3.8585 | 3.8586 | 3.8587 | 3.8587 | 3.8588 | 3.8588 | 3.8589 | 3.8590 | 3.8590 | 3.8591 |
| | 0 | 30 | 3.8591 | 3.8592 | 3.8593 | 3.8593 | 3.8594 | 3 8594 | 3.8595 | 3.8596 | 3.8596 | 3.8597 |
| | 0 | 40 | 3.8597 | 3.8598 | 3.8599 | 3.8599 | 3.8600 | 3.8600 | 3.8601 | 3.8602 | 3.8602 | 3.8603 |
| | 0 | 50 | 3.8603 | 3.8604 | 3.8605 | 3.8605 | 3.8606 | 3.8606 | 3.8607 | 3.8608 | 3.8608 | 3.8609 |
| 2 | 1 | 0 | 3.8609 | 3.8610 | 3.8611 | 3.8611 | 3.8612 | 3.8612 | 3.8613 | 3.8614 | 3 8614 | 3.8615 |
| | 1 | 10 | 3.8615 | 3.8616 | 3.8617 | 3.8617 | 3.8618 | 3.8618 | 3.8619 | 3.8620 | 3.8620 | 3.8621 |
| | 1 | 20 | 3.8621 | 3.8622 | 3.8623 | 3.8623 | 3.8624 | 3.8624 | 3.8625 | 3.8625 | 3.8626 | 3.8627 |
| | 1 | 30 | 3.8627 | 3.8628 | 3.8628 | 3.8629 | 3.8630 | 3.8630 | 3.8631 | 3.8631 | 3.8632 | 3.8633 |
| | 1 | 40 | 3.8633 | 3.8634 | 3.8634 | 3.8635 | 3.8636 | 3.8636 | 3.8637 | 3.8637 | 3.8638 | 3.8639 |
| | 1 | 50 | 3.8639 | 3.8640 | 3.8640 | 3.8641 | 3.8642 | 3.8642 | 3.8643 | 3.8643 | 3.8644 | 3.8645 |
| 2 | 2 | 0 | 3.8645 | 3.8646 | 3.8646 | 3.8647 | 3.8647 | 3.8648 | 3.8649 | 3.8649 | 3.8650 | 3.8650 |
| | 2 | 10 | 3.8651 | 3.8652 | 3.8652 | 3.8653 | 3.8653 | 3.8654 | 3.8655 | 3.8655 | 3.8656 | 3.8656 |
| | 2 | 20 | 3.8657 | 3.8658 | 3.8658 | 3.8659 | 3.8659 | 3.8660 | 3.8661 | 3.8661 | 3.8662 | 3.8662 |
| | 2 | 30 | 3.8663 | 3.8663 | 3.8664 | 3.8665 | 3.8665 | 3.8666 | 3.8666 | 3.8667 | 3.8668 | 3.8668 |
| | 2 | 40 | 3.8669 | 3.8669 | 3.8670 | 3.8671 | 3.8671 | 3.8672 | 3.8672 | 3.8673 | 3.8673 | 3.8674 |
| | 2 | 50 | 3.8675 | 3.8675 | 3.8676 | 3.8676 | 3.8677 | 3.8678 | 3.8678 | 3.8679 | 3.8679 | 3.8680 |
| 2 | 3 | 0 | 3.8681 | 3.8681 | 3.8682 | 3.8682 | 3.8683 | 3.8684 | 3.8684 | 3.8685 | 3.8685 | 3.8686 |
| | 3 | 10 | 3.8686 | 3.8687 | 3.8688 | 3.8688 | 3.8689 | 3.8689 | 3.8690 | 3.8691 | 3.8691 | 3.8692 |
| | 3 | 20 | 3.8692 | 3.8693 | 3.8693 | 3.8694 | 3.8695 | 3.8695 | 3.8696 | 3.8696 | 3.8697 | 3.8698 |
| | 3 | 30 | 3.8698 | 3.8699 | 3.8699 | 3.8700 | 3.8701 | 3.8701 | 3.8702 | 3.8702 | 3.8703 | 3.8703 |
| | 3 | 40 | 3.8704 | 3.8705 | 3.8705 | 3.8706 | 3.8706 | 3.8707 | 3.8708 | 3.8708 | 3.8709 | 3.8709 |
| | 3 | 50 | 3.8710 | 3 8710 | 3.8711 | 3.8712 | 3.8712 | 3.8713 | 3.8713 | 3.8714 | 3.8715 | 3.8715 |
| 2 | 4 | 0 | 3.8716 | 3.8716 | 3.8717 | 3.8717 | 3.8718 | 3.8719 | 3.8719 | 3.8720 | 3.8720 | 3.8721 |
| | 4 | 10 | 3.8722 | 3.8722 | 3.8723 | 3.8723 | 3.8724 | 3.8724 | 3.8725 | 3.8726 | 3.8726 | 3.8727 |
| | 4 | 20 | 3.8727 | 3.8728 | 3.8729 | 3.8729 | 3.8730 | 3.8730 | 3.8731 | 3.8731 | 3.8732 | 3.8733 |
| | 4 | 30 | 3.8733 | 3.8734 | 3.8734 | 3.8735 | 3.8736 | 3.8736 | 3.8737 | 3.8737 | 3.8738 | 3.8738 |
| | 4 | 40 | 3.8739 | 3.8740 | 3.8740 | 3.8741 | 3.8741 | 3.8742 | 3.8742 | 3.8743 | 3.8744 | 3.8744 |
| | 4 | 50 | 3.8745 | 3.8745 | 3.8746 | 3.8747 | 3.8747 | 3.8748 | 3.8748 | 3.8749 | 3.8749 | 3.8750 |
| 2 | 5 | 0 | 3.8751 | 3.8751 | 3.8752 | 3.8752 | 3.8753 | 3.8754 | 3.8754 | 3.8755 | 3.8755 | 3.8756 |
| | 5 | 10 | 3.8756 | 3.8757 | 3.8758 | 3.8758 | 3.8759 | 3.8759 | 3.8760 | 3.8760 | 3.8761 | 3.8762 |
| | 5 | 20 | 3.8762 | 3.8763 | 3.8763 | 3.8764 | 3.8764 | 3.8765 | 3.8766 | 3.8766 | 3.8767 | 3.8767 |
| | 5 | 30 | 3.8768 | 3.8769 | 3.8769 | 3.8770 | 3.8770 | 3.8771 | 3.8771 | 3.8772 | 3.8773 | 3.8773 |
| | 5 | 40 | 3.8774 | 3.8774 | 3.8775 | 3.8775 | 3.8776 | 3.8777 | 3.8777 | 3.8778 | 3 8778 | 3.8779 |
| | 5 | 50 | 3.8779 | 3.8780 | 3.8781 | 3.8781 | 3.8782 | 3.8782 | 3.8783 | 3.8783 | 3.8784 | 3.8785 |
| 2 | 6 | 0 | 3.8785 | 3.8786 | 3.8786 | 3.8787 | 3.8788 | 3.8788 | 3.8789 | 3.8789 | 3.8790 | 3.8790 |
| | 6 | 10 | 3.8791 | 3.8792 | 3.8792 | 3.8793 | 3.8793 | 3.8794 | 3.8794 | 3.8795 | 3.8796 | 3.8796 |
| | 6 | 20 | 3.8797 | 3.8797 | 3.8798 | 3.8798 | 3.8799 | 3.8800 | 3.8800 | 3.8801 | 3.8801 | 3.8802 |
| | 6 | 30 | 3.8802 | 3.8803 | 3.8804 | 3.8804 | 3.8805 | 3.8805 | 3.8806 | 3.8806 | 3.8807 | 3.8808 |
| | 6 | 40 | 3.8808 | 3.8809 | 3.8809 | 3.8810 | 3.8810 | 3.8811 | 3.8812 | 3.8812 | 3.8813 | 3.8813 |
| | 6 | 50 | 3.8814 | 3.8814 | 3.8815 | 3.8816 | 3.8816 | 3.8817 | 3.8817 | 3.8818 | 3.8818 | 3.8819 |
| 2 | 7 | 0 | 3.8820 | 3.8820 | 3.8821 | 3.8821 | 3.8822 | 3.8822 | 3.8823 | 3.8824 | 3.8824 | 3.8825 |
| | 7 | 10 | 3.8825 | 3.8826 | 3.8826 | 3.8827 | 3.8828 | 3.8828 | 3.8829 | 3.8829 | 3.8830 | 3.8830 |
| | 7 | 20 | 3.8831 | 3.8832 | 3.8832 | 3.8833 | 3.8833 | 3.8834 | 3.8834 | 3.8835 | 3.8835 | 3.8836 |
| | 7 | 30 | 3.8837 | 3.8837 | 3.8838 | 3.8838 | 3.8839 | 3.8839 | 3.8840 | 3.8841 | 3.8841 | 3.8842 |
| | 7 | 40 | 3.8842 | 3.8843 | 3.8843 | 3.8844 | 3.8845 | 3.8845 | 3.8846 | 3.8846 | 3.8847 | 3.8847 |
| | 7 | 50 | 3.8848 | 3 8849 | 3.8849 | 3.8850 | 3.8850 | 3.8851 | 3.8851 | 3.8852 | 3.8852 | 3.8853 |
| 2 | 8 | 0 | 3.8854 | 3.8854 | 3.8855 | 3.8855 | 3.8856 | 3.8856 | 3.8857 | 3.8858 | 3.8858 | 3.8859 |
| | 8 | 10 | 3.8859 | 3.8860 | 3.8860 | 3.8861 | 3.8862 | 3.8862 | 3.8863 | 3.8863 | 3.8864 | 3.8864 |
| | 8 | 20 | 3.8865 | 3.8865 | 3.8866 | 3.8867 | 3.8867 | 3.8868 | 3.8868 | 3.8869 | 3.8869 | 3.8870 |
| | 8 | 30 | 3.8871 | 3.8871 | 3.8872 | 3.8872 | 3.8873 | 3.8873 | 3.8874 | 3.8874 | 3.8875 | 3.8876 |
| | 8 | 40 | 3.8876 | 3.8877 | 3.8877 | 3.8878 | 3.8878 | 3.8879 | 3.8880 | 3.8880 | 3.8881 | 3.8881 |
| | 8 | 50 | 3.8882 | 3.8882 | 3.8883 | 3.8883 | 3.8884 | 3.8885 | 3.8885 | 3.8886 | 3.8886 | 3.8887 |
| 2 | 9 | 0 | 3.8887 | 3.8888 | 3.8889 | 3.8889 | 3.8890 | 3.8890 | 3.8891 | 3.8891 | 3.8892 | 3.8892 |
| | 9 | 10 | 3.8893 | 3.8894 | 3.8894 | 3.8895 | 3.8895 | 3.8896 | 3.8896 | 3.8897 | 3.8897 | 3.8898 |
| | 9 | 20 | 3.8899 | 3.8899 | 3.8900 | 3.8900 | 3.8901 | 3.8901 | 3.8902 | 3.8903 | 3.8903 | 3.8904 |
| | 9 | 30 | 3.8904 | 3.8905 | 3.8905 | 3.8906 | 3.8906 | 3.8907 | 3.8908 | 3.8908 | 3.8909 | 3.8909 |
| | 9 | 40 | 3.8910 | 3.8910 | 3 8911 | 3.8911 | 3.8912 | 3.8912 | 3.8913 | 3.8914 | 3.8914 | 3.8915 |
| | 9 | 50 | 3.8915 | 3.8916 | 3.8916 | 3.8917 | 3.8918 | 3.8918 | 3.8919 | 3.8919 | 3.8920 | 3.8920 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{2}^{h}$ | $\overset{\prime}{10}^{m}$ | $0^{s}$ | 3.8921 | 3.8922 | 3.8922 | 3.8923 | 3.8923 | 3.8924 | 3.8924 | 3.8925 | 3.8925 | 3.8926 |
| | 10 | 10 | 3.8927 | 3.8927 | 3.8928 | 3.8928 | 3.8929 | 3.8929 | 3.8930 | 3.8930 | 3.8931 | 3.8932 |
| | 10 | 20 | 3.8932 | 3.8933 | 3.8933 | 3.8934 | 3.8934 | 3.8935 | 3.8935 | 3.8936 | 3.8937 | 3.8937 |
| | 10 | 30 | 3.8938 | 3.8938 | 3.8939 | 3.8939 | 3.8940 | 3.8940 | 3.8941 | 3.8941 | 3.8942 | 3.8943 |
| | 10 | 40 | 3.8943 | 3.8944 | 3.8944 | 3.8945 | 3.8945 | 3.8946 | 3.8946 | 3.8947 | 3.8948 | 3.8948 |
| | 10 | 50 | 3.8949 | 3.8949 | 3.8950 | 3.8950 | 3.8951 | 3.8951 | 3.8952 | 3.8953 | 3.8953 | 3.8954 |
| 2 | 11 | 0 | 3.8954 | 3.8955 | 3.8955 | 3.8956 | 3.8956 | 3.8957 | 3.8958 | 3.8958 | 3.8959 | 3.8959 |
| | 11 | 10 | 3.8960 | 3.8960 | 3.8961 | 3.8961 | 3.8962 | 3.8963 | 3.8963 | 3.8964 | 3.8964 | 3.8965 |
| | 11 | 20 | 3.8965 | 3.8966 | 3.8966 | 3.8967 | 3.8967 | 3.8968 | 3.8969 | 3.8969 | 3.8970 | 3.8970 |
| | 11 | 30 | 3.8971 | 3.8971 | 3.8972 | 3.8972 | 3.8973 | 3.8974 | 3.8974 | 3.8975 | 3.8975 | 3.8976 |
| | 11 | 40 | 3.8976 | 3.8977 | 3.8977 | 3.8978 | 3.8978 | 3.8979 | 3.8980 | 3.8980 | 3.8981 | 3.8981 |
| | 11 | 50 | 3.8982 | 3.8982 | 3.8983 | 3.8983 | 3.8984 | 3.8985 | 3.8985 | 3.8986 | 3.8986 | 3.8987 |
| 2 | 12 | 0 | 3.8987 | 3.8988 | 3.8988 | 3.8989 | 3.8989 | 3.8990 | 3.8991 | 3.8991 | 3.8992 | 3.8992 |
| | 12 | 10 | 3.8993 | 3.8993 | 3.8994 | 3.8994 | 3.8995 | 3.8995 | 3.8996 | 3.8997 | 3.8997 | 3.8998 |
| | 12 | 20 | 3.8998 | 3.8999 | 3.8999 | 3.9000 | 3.9000 | 3.9001 | 3.9001 | 3.9002 | 3.9003 | 3.9003 |
| | 12 | 30 | 3.9004 | 3.9004 | 3.9005 | 3.9005 | 3.9006 | 3.9006 | 3.9007 | 3.9007 | 3.9008 | 3.9009 |
| | 12 | 40 | 3.9009 | 3.9010 | 3.9010 | 3.9011 | 3.9011 | 3.9012 | 3.9012 | 3.9013 | 3.9013 | 3.9014 |
| | 12 | 50 | 3.9015 | 3.9015 | 3.9016 | 3.9016 | 3.9017 | 3.9017 | 3.9018 | 3.9018 | 3.9019 | 3.9019 |
| 2 | 13 | 0 | 3.9020 | 3.9021 | 3.9021 | 3.9022 | 3.9022 | 3.9023 | 3.9023 | 3.9024 | 3.9024 | 3.9025 |
| | 13 | 10 | 3.9025 | 3.9026 | 3.9027 | 3.9027 | 3.9028 | 3.9028 | 3.9029 | 3.9029 | 3.9030 | 3.9030 |
| | 13 | 20 | 3.9031 | 3.9031 | 3.9032 | 3.9033 | 3.9033 | 3.9034 | 3.9034 | 3.9035 | 3.9035 | 3.9036 |
| | 13 | 30 | 3.9036 | 3.9037 | 3.9037 | 3.9038 | 3.9038 | 3.9039 | 3.9040 | 3.9040 | 3.9041 | 3.9041 |
| | 13 | 40 | 3.9042 | 3.9042 | 3.9043 | 3.9043 | 3.9044 | 3.9044 | 3.9045 | 3.9046 | 3.9046 | 3.9047 |
| | 13 | 50 | 3.9047 | 3.9048 | 3.9048 | 3.9049 | 3.9049 | 3.9050 | 3.9050 | 3.9051 | 3.9051 | 3.9052 |
| 2 | 14 | 0 | 3.9053 | 3.9053 | 3.9054 | 3.9054 | 3.9055 | 3.9055 | 3.9056 | 3.9056 | 3.9057 | 3.9057 |
| | 14 | 10 | 3.9058 | 3.9058 | 3.9059 | 3.9060 | 3.9060 | 3.9061 | 3.9061 | 3.9062 | 3.9062 | 3.9063 |
| | 14 | 20 | 3.9063 | 3.9064 | 3.9064 | 3.9065 | 3.9066 | 3.9066 | 3.9067 | 3.9067 | 3.9068 | 3.9068 |
| | 14 | 30 | 3.9069 | 3.9069 | 3.9070 | 3.9070 | 3.9071 | 3.9071 | 3.9072 | 3.9073 | 3.9073 | 3.9074 |
| | 14 | 40 | 3.9074 | 3.9075 | 3.9075 | 3.9076 | 3.9076 | 3.9077 | 3.9077 | 3.9078 | 3.9078 | 3.9079 |
| | 14 | 50 | 3.9079 | 3.9080 | 3.9081 | 3.9081 | 3.9082 | 3.9082 | 3.9083 | 3.9083 | 3.9084 | 3.9084 |
| 2 | 15 | 0 | 3.9085 | 3.9085 | 3.9086 | 3.9086 | 3.9087 | 3.9088 | 3.9088 | 3.9089 | 3.9089 | 3.9090 |
| | 15 | 10 | 3.9090 | 3.9091 | 3.9091 | 3.9092 | 3.9092 | 3.9093 | 3.9093 | 3.9094 | 3.9094 | 3.9095 |
| | 15 | 20 | 3.9096 | 3.9096 | 3.9097 | 3.9097 | 3.9098 | 3.9098 | 3.9099 | 3.9099 | 3.9100 | 3.9100 |
| | 15 | 30 | 3.9101 | 3.9101 | 3.9102 | 3.9103 | 3.9103 | 3.9104 | 3.9104 | 3.9105 | 3.9105 | 3.9106 |
| | 15 | 40 | 3.9106 | 3.9107 | 3.9107 | 3.9108 | 3.9108 | 3.9109 | 3.9109 | 3.9110 | 3.9111 | 3.9111 |
| | 15 | 50 | 3.9112 | 3.9112 | 3.9113 | 3.9113 | 3.9114 | 3.9114 | 3.9115 | 3.9115 | 3.9116 | 3.9116 |
| 2 | 16 | 0 | 3.9117 | 3.9117 | 3.9118 | 3.9118 | 3.9119 | 3.9120 | 3.9120 | 3.9121 | 3.9121 | 3.9122 |
| | 16 | 10 | 3.9122 | 3.9123 | 3.9123 | 3.9124 | 3.9124 | 3.9125 | 3.9125 | 3.9126 | 3.9126 | 3.9127 |
| | 16 | 20 | 3.9128 | 3.9128 | 3.9129 | 3.9129 | 3.9130 | 3.9130 | 3.9131 | 3.9131 | 3.9132 | 3.9132 |
| | 16 | 30 | 3.9133 | 3.9133 | 3.9134 | 3.9134 | 3.9135 | 3.9135 | 3.9136 | 3.9137 | 3.9137 | 3.9138 |
| | 16 | 40 | 3.9138 | 3.9139 | 3.9139 | 3.9140 | 3.9140 | 3.9141 | 3.9141 | 3.9142 | 3.9142 | 3.9143 |
| | 16 | 50 | 3.9143 | 3.9144 | 3.9144 | 3.9145 | 3.9146 | 3.9146 | 3.9147 | 3.9147 | 3.9148 | 3.9148 |
| 2 | 17 | 0 | 3.9149 | 3.9149 | 3.9150 | 3.9150 | 3.9151 | 3.9151 | 3.9152 | 3.9152 | 3.9153 | 3.9153 |
| | 17 | 10 | 3.9154 | 3.9155 | 3.9155 | 3.9156 | 3.9156 | 3.9157 | 3.9157 | 3.9158 | 3.9158 | 3.9159 |
| | 17 | 20 | 3.9159 | 3.9160 | 3.9160 | 3.9161 | 3.9161 | 3.9162 | 3.9162 | 3.9163 | 3.9163 | 3.9164 |
| | 17 | 30 | 3.9165 | 3.9165 | 3.9166 | 3.9166 | 3.9167 | 3.9167 | 3.9168 | 3.9168 | 3.9169 | 3.9169 |
| | 17 | 40 | 3.9170 | 3.9170 | 3.9171 | 3.9171 | 3.9172 | 3.9172 | 3.9173 | 3.9173 | 3.9174 | 3.9175 |
| | 17 | 50 | 3.9175 | 3.9176 | 3.9176 | 3.9177 | 3.9177 | 3.9178 | 3.9178 | 3.9179 | 3.9179 | 3.9180 |
| 2 | 18 | 0 | 3.9180 | 3.9181 | 3.9181 | 3.9182 | 3.9182 | 3.9183 | 3.9183 | 3.9184 | 3.9184 | 3.9185 |
| | 18 | 10 | 3.9186 | 3.9186 | 3.9187 | 3.9187 | 3.9188 | 3.9188 | 3.9189 | 3.9189 | 3.9190 | 3.9190 |
| | 18 | 20 | 3.9191 | 3.9191 | 3.9192 | 3.9192 | 3.9193 | 3.9193 | 3.9194 | 3.9194 | 3.9195 | 3.9195 |
| | 18 | 30 | 3.9196 | 3.9197 | 3.9197 | 3.9198 | 3.9198 | 3.9199 | 3.9199 | 3.9200 | 3.9200 | 3.9201 |
| | 18 | 40 | 3.9201 | 3.9202 | 3.9202 | 3.9203 | 3.9203 | 3.9204 | 3.9204 | 3.9205 | 3.9205 | 3.9206 |
| | 18 | 50 | 3.9206 | 3.9207 | 3.9207 | 3.9208 | 3.9209 | 3.9209 | 3.9210 | 3.9210 | 3.9211 | 3.9211 |
| 2 | 19 | 0 | 3.9212 | 3.9212 | 3.9213 | 3.9213 | 3.9214 | 3.9214 | 3.9215 | 3.9215 | 3.9216 | 3.9216 |
| | 19 | 10 | 3.9217 | 3.9217 | 3.9218 | 3.9218 | 3.9219 | 3.9219 | 3.9220 | 3.9221 | 3.9221 | 3.9222 |
| | 19 | 20 | 3.9222 | 3.9223 | 3.9223 | 3.9224 | 3.9224 | 3.9225 | 3.9225 | 3.9226 | 3.9226 | 3.9227 |
| | 19 | 30 | 3.9227 | 3.9228 | 3.9228 | 3.9229 | 3.9229 | 3.9230 | 3.9230 | 3.9231 | 3.9231 | 3.9232 |
| | 19 | 40 | 3.9232 | 3.9233 | 3.9233 | 3.9234 | 3.9235 | 3.9235 | 3.9236 | 3.9236 | 3.9237 | 3.9237 |
| | 19 | 50 | 3.9238 | 3.9238 | 3.9239 | 3.9239 | 3.9240 | 3.9240 | 3.9241 | 3.9241 | 3.9242 | 3.9242 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{2}{}^{h}\cdot\overset{\prime}{20}{}^{m}\cdot 0^{s}\cdot$ | 3.9243 | 3.9243 | 3.9244 | 3.9244 | 3.9245 | 3.9245 | 3.9246 | 3.9246 | 3.9247 | 3.9247 |
| 20 10 | 3.9248 | 3.9248 | 3.9249 | 3.9250 | 3.9250 | 3.9251 | 3.9251 | 3.9252 | 3.9252 | 3.9253 |
| 20 20 | 3.9253 | 3.9254 | 3.9254 | 3.9255 | 3.9255 | 3.9256 | 3.9256 | 3.9257 | 3.9257 | 3.9258 |
| 20 30 | 3.9258 | 3.9259 | 3.9259 | 3.9260 | 3.9260 | 3.9261 | 3.9261 | 3.9262 | 3.9262 | 3.9263 |
| 20 40 | 3.9263 | 3.9264 | 3.9264 | 3.9265 | 3.9265 | 3.9266 | 3.9267 | 3.9267 | 3.9268 | 3.9268 |
| 20 50 | 3.9269 | 3.9269 | 3.9270 | 3.9270 | 3.9271 | 3.9271 | 3.9272 | 3.9272 | 3.9273 | 3.9273 |
| 2 21 0 | 3.9274 | 3.9274 | 3.9275 | 3.9275 | 3.9276 | 3.9276 | 3.9277 | 3.9277 | 3.9278 | 3.9278 |
| 21 10 | 3.9279 | 3.9279 | 3.9280 | 3.9280 | 3.9281 | 3.9281 | 3.9282 | 3.9282 | 3.9283 | 3.9283 |
| 21 20 | 3.9284 | 3.9284 | 3.9285 | 3.9285 | 3.9286 | 3.9287 | 3.9287 | 3.9288 | 3.9288 | 3.9289 |
| 21 30 | 3.9289 | 3.9290 | 3.9290 | 3.9291 | 3.9291 | 3.9292 | 3.9292 | 3.9293 | 3.9293 | 3.9294 |
| 21 40 | 3.9294 | 3.9295 | 3.9295 | 3.9296 | 3.9296 | 3.9297 | 3.9297 | 3.9298 | 3.9298 | 3.9299 |
| 21 50 | 3.9299 | 3.9300 | 3.9300 | 3.9301 | 3.9301 | 3.9302 | 3.9302 | 3.9303 | 3.9303 | 3.9304 |
| 2 22 0 | 3.9304 | 3.9305 | 3.9305 | 3.9306 | 3.9306 | 3.9307 | 3.9307 | 3.9308 | 3.9308 | 3.9309 |
| 22 10 | 3.9309 | 3.9310 | 3.9311 | 3.9311 | 3.9312 | 3.9312 | 3.9313 | 3.9313 | 3.9314 | 3.9314 |
| 22 20 | 3.9315 | 3.9315 | 3.9316 | 3.9316 | 3.9317 | 3.9317 | 3.9318 | 3.9318 | 3.9319 | 3.9319 |
| 22 30 | 3.9320 | 3.9320 | 3.9321 | 3.9321 | 3.9322 | 3.9322 | 3.9323 | 3.9323 | 3.9324 | 3.9324 |
| 22 40 | 3.9325 | 3.9325 | 3.9326 | 3.9326 | 3.9327 | 3.9327 | 3.9328 | 3.9328 | 3.9329 | 3.9329 |
| 22 50 | 3.9330 | 3.9330 | 3.9331 | 3.9331 | 3.9332 | 3.9332 | 3.9333 | 3.9333 | 3.9334 | 3.9334 |
| 2 23 0 | 3.9335 | 3.9335 | 3.9336 | 3.9336 | 3.9337 | 3.9337 | 3.9338 | 3.9338 | 3.9339 | 3.9339 |
| 23 10 | 3.9340 | 3.9340 | 3.9341 | 3.9341 | 3.9342 | 3.9342 | 3.9343 | 3.9343 | 3.9344 | 3.9344 |
| 23 20 | 3.9345 | 3.9345 | 3.9346 | 3.9346 | 3.9347 | 3.9348 | 3.9348 | 3.9349 | 3.9349 | 3.9350 |
| 23 30 | 3.9350 | 3.9351 | 3.9351 | 3.9352 | 3.9352 | 3.9353 | 3.9353 | 3 9354 | 3.9354 | 3.9355 |
| 23 40 | 3.9355 | 3.9356 | 3.9356 | 3.9357 | 3.9357 | 3.9358 | 3.9358 | 3.9359 | 3.9359 | 3.9360 |
| 23 50 | 3.9360 | 3.9361 | 3.9361 | 3.9362 | 3.9362 | 3.9363 | 3.9363 | 3.9364 | 3.9364 | 3.9365 |
| 2 24 0 | 3.9365 | 3.9366 | 3.9366 | 3.9367 | 3.9367 | 3.9368 | 3.9368 | 3.9369 | 3.9369 | 3.9370 |
| 24 10 | 3.9370 | 3.9371 | 3.9371 | 3.9372 | 3.9372 | 3.9373 | 3.9373 | 3.9374 | 3.9374 | 3.9375 |
| 24 20 | 3.9375 | 3.9376 | 3.9376 | 3.9377 | 3.9377 | 3.9378 | 3.9378 | 3.9379 | 3.9379 | 3.9380 |
| 24 30 | 3.9380 | 3.9381 | 3.9381 | 3.9382 | 3.9382 | 3.9383 | 3.9383 | 3.9384 | 3.9384 | 3.9385 |
| 24 40 | 3.9385 | 3.9386 | 3.9386 | 3.9387 | 3.9387 | 3.9388 | 3.9388 | 3.9389 | 3.9389 | 3.9390 |
| 24 50 | 3.9390 | 3.9391 | 3.9391 | 3.9392 | 3.9392 | 3 9393 | 3.9393 | 3.9394 | 3.9394 | 3.9395 |
| 2 25 0 | 3.9395 | 3.9396 | 3.9396 | 3.9397 | 3.9397 | 3.9398 | 3.9398 | 3.9399 | 3.9399 | 3.9400 |
| 25 10 | 3.9400 | 3.9401 | 3.9401 | 3.9402 | 3.9402 | 3.9403 | 3.9403 | 3.9404 | 3.9404 | 3.9405 |
| 25 20 | 3.9405 | 3.9406 | 3.9406 | 3.9407 | 3.9407 | 3.9408 | 3.9408 | 3.9409 | 3.9409 | 3.9410 |
| 25 30 | 3.9410 | 3.9411 | 3.9411 | 3.9412 | 3.9412 | 3.9413 | 3.9413 | 3.9414 | 3.9414 | 3.9415 |
| 25 40 | 3.9415 | 3.9416 | 3.9416 | 3.9417 | 3.9417 | 3.9418 | 3.9418 | 3.9419 | 3.9419 | 3.9420 |
| 25 50 | 3.9420 | 3.9421 | 3.9421 | 3.9422 | 3.9422 | 3.9423 | 3.9423 | 3.9424 | 3.9424 | 3.9425 |
| 2 26 0 | 3.9425 | 3.9426 | 3.9426 | 3.9427 | 3.9427 | 3.9428 | 3.9428 | 3.9429 | 3.9429 | 3.9430 |
| 26 10 | 3.9430 | 3.9430 | 3.9431 | 3.9431 | 3.9432 | 3.9432 | 3.9433 | 3.9433 | 3.9434 | 3.9434 |
| 26 20 | 3.9435 | 3.9435 | 3.9436 | 3.9436 | 3.9437 | 3.9437 | 3.9438 | 3.9438 | 3.9439 | 3.9439 |
| 26 30 | 3.9440 | 3.9440 | 3.9441 | 3.9441 | 3.9442 | 3.9442 | 3.9443 | 3.9443 | 3.9444 | 3.9444 |
| 26 40 | 3.9445 | 3.9445 | 3.9446 | 3.9446 | 3.9447 | 3.9447 | 3.9448 | 3.9448 | 3.9449 | 3.9449 |
| 26 50 | 3.9450 | 3.9450 | 3.9451 | 3.9451 | 3.9452 | 3.9452 | 3.9453 | 3.9453 | 3.9454 | 3.9454 |
| 2 27 0 | 3.9455 | 3.9455 | 3.9456 | 3.9456 | 3.9457 | 3.9457 | 3.9458 | 3.9458 | 3.9459 | 3.9459 |
| 27 10 | 3.9460 | 3.9460 | 3.9461 | 3.9461 | 3.9462 | 3.9462 | 3.9463 | 3.9463 | 3.9464 | 3.9464 |
| 27 20 | 3.9465 | 3.9465 | 3.9466 | 3.9466 | 3.9466 | 3.9467 | 3.9467 | 3.9468 | 3.9468 | 3.9469 |
| 27 30 | 3.9469 | 3.9470 | 3.9470 | 3.9471 | 3.9471 | 3.9472 | 3.9472 | 3.9473 | 3.9473 | 3.9474 |
| 27 40 | 3.9474 | 3.9475 | 3.9475 | 3.9476 | 3.9476 | 3.9477 | 3.9477 | 3.9478 | 3.9478 | 3.9479 |
| 27 50 | 3.9479 | 3.9480 | 3.9480 | 3.9481 | 3.9481 | 3.9482 | 3.9482 | 3.9483 | 3.9483 | 3.9484 |
| 2 28 0 | 3.9484 | 3.9485 | 3.9485 | 3.9486 | 3.9486 | 3.9487 | 3.9487 | 3.9488 | 3.9488 | 3.9489 |
| 28 10 | 3.9489 | 3.9490 | 3.9490 | 3.9490 | 3.9491 | 3.9491 | 3.9492 | 3.9492 | 3.9493 | 3.9493 |
| 28 20 | 3.9494 | 3.9494 | 3.9495 | 3.9495 | 3.9496 | 3.9496 | 3.9497 | 3.9497 | 3.9498 | 3.9498 |
| 28 30 | 3.9499 | 3.9499 | 3.9500 | 3.9500 | 3.9501 | 3.9501 | 3.9502 | 3.9502 | 3.9503 | 3.9503 |
| 28 40 | 3.9504 | 3.9504 | 3.9505 | 3.9505 | 3.9506 | 3.9506 | 3.9507 | 3.9507 | 3.9508 | 3.9508 |
| 28 50 | 3.9509 | 3.9509 | 3.9509 | 3.9510 | 3.9510 | 3.9511 | 3.9511 | 3.9512 | 3.9512 | 3.9513 |
| 2 29 0 | 3.9513 | 3.9514 | 3.9514 | 3.9515 | 3.9515 | 3.9516 | 3.9516 | 3.9517 | 3.9517 | 3.9518 |
| 29 10 | 3.9518 | 3.9519 | 3.9519 | 3.9520 | 3.9520 | 3.9521 | 3.9521 | 3.9522 | 3.9522 | 3.9523 |
| 29 20 | 3.9523 | 3.9524 | 3.9524 | 3.9525 | 3.9525 | 3.9526 | 3.9526 | 3.9526 | 3.9527 | 3.9527 |
| 29 30 | 3.9528 | 3.9528 | 3.9529 | 3.9529 | 3.9530 | 3.9530 | 3.9531 | 3.9531 | 3.9532 | 3.9532 |
| 29 40 | 3.9533 | 3.9533 | 3.9534 | 3.9534 | 3.9535 | 3.9535 | 3.9536 | 3.9536 | 3.9537 | 3.9537 |
| 29 50 | 3.9538 | 3.9538 | 3.9539 | 3.9539 | 3.9540 | 3.9540 | 3.9540 | 3.9541 | 3.9541 | 3.9542 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ° 2h. | ′ 30m. | ″ 0s. | 3.9542 | 3.9543 | 3.9543 | 3.9544 | 3.9544 | 3.9545 | 3.9545 | 3.9546 | 3.9546 | 3.9547 |
| | 30 | 10 | 3.9547 | 3.9548 | 3.9548 | 3.9549 | 3.9549 | 3.9550 | 3.9550 | 3.9551 | 3.9551 | 3.9552 |
| | 30 | 20 | 3.9552 | 3.9553 | 3.9553 | 3.9554 | 3.9554 | 3.9554 | 3.9555 | 3.9555 | 3.9556 | 3.9556 |
| | 30 | 30 | 3.9557 | 3.9557 | 3.9558 | 3.9558 | 3.9559 | 3.9559 | 3.9560 | 3.9560 | 3.9561 | 3.9561 |
| | 30 | 40 | 3.9562 | 3.9562 | 3.9563 | 3.9563 | 3.9564 | 3.9564 | 3.9565 | 3.9565 | 3.9566 | 3.9566 |
| | 30 | 50 | 3.9566 | 3.9567 | 3.9567 | 3.9568 | 3.9568 | 3.9569 | 3.9569 | 3.9570 | 3.9570 | 3.9571 |
| 2 | 31 | 0 | 3.9571 | 3.9572 | 3.9572 | 3.9573 | 3.9573 | 3.9574 | 3.9574 | 3.9575 | 3.9575 | 3.9576 |
| | 31 | 10 | 3.9576 | 3.9577 | 3.9577 | 3.9578 | 3.9578 | 3.9578 | 3.9579 | 3.9579 | 3.9580 | 3.9580 |
| | 31 | 20 | 3.9581 | 3.9581 | 3.9582 | 3.9582 | 3.9583 | 3.9583 | 3.9584 | 3.9584 | 3.9585 | 3.9585 |
| | 31 | 30 | 3.9586 | 3.9586 | 3.9587 | 3.9587 | 3.9588 | 3.9588 | 3.9589 | 3.9589 | 3.9589 | 3.9590 |
| | 31 | 40 | 3.9590 | 3.9591 | 3.9591 | 3.9592 | 3.9592 | 3.9593 | 3.9593 | 3.9594 | 3.9594 | 3.9595 |
| | 31 | 50 | 3.9595 | 3.9596 | 3.9596 | 3.9697 | 3.9597 | 3.9598 | 3.9598 | 3.9599 | 3.9599 | 3.9599 |
| 2 | 32 | 0 | 3.9600 | 3.9600 | 3.9601 | 3.9601 | 3.9602 | 3.9602 | 3.9603 | 3.9603 | 3.9604 | 3.9604 |
| | 32 | 10 | 3.9605 | 3.9605 | 3.9606 | 3.9606 | 3.9607 | 3.9607 | 3.9608 | 3.9608 | 3.9609 | 3.9609 |
| | 32 | 20 | 3.9609 | 3.9610 | 3.9610 | 3.9611 | 3.9611 | 3.9612 | 3.9612 | 3.9613 | 3.9613 | 3.9614 |
| | 32 | 30 | 3.9614 | 3.9615 | 3.9615 | 3.9616 | 3.9616 | 3.9617 | 3.9617 | 3.9618 | 3.9618 | 3.9618 |
| | 32 | 40 | 3.9619 | 3.9619 | 3.9620 | 3.9620 | 3.9621 | 3.9621 | 3.9622 | 3.9622 | 3.9623 | 3.9623 |
| | 32 | 50 | 3.9624 | 3.9624 | 3.9625 | 3.9625 | 3.9626 | 3.9626 | 3.9627 | 3.9627 | 3.9627 | 3.9628 |
| 2 | 33 | 0 | 3.9628 | 3.9629 | 3.9629 | 3.9630 | 3.9630 | 3.9631 | 3.9631 | 3.9632 | 3.9632 | 3.9633 |
| | 33 | 10 | 3.9633 | 3.9634 | 3.9634 | 3.9634 | 3.9635 | 3.9635 | 3.9636 | 3.9636 | 3.9637 | 3.9637 |
| | 33 | 20 | 3.9638 | 3.9638 | 3.9639 | 3.9639 | 3.9640 | 3.9640 | 3.9641 | 3.9641 | 3.9642 | 3.9642 |
| | 33 | 30 | 3.9642 | 3.9643 | 3.9643 | 3.9644 | 3.9644 | 3.9645 | 3.9645 | 3.9646 | 3.9646 | 3.9647 |
| | 33 | 40 | 3.9647 | 3.9648 | 3.9648 | 3.9649 | 3.9649 | 3.9650 | 3.9650 | 3.9651 | 3.9651 | 3.9652 |
| | 33 | 50 | 3.9652 | 3.9653 | 3.9653 | 3.9653 | 3.9654 | 3.9654 | 3.9655 | 3.9655 | 3.9656 | 3.9656 |
| 2 | 34 | 0 | 3.9657 | 3.9657 | 3.9658 | 3.9658 | 3.9658 | 3.9659 | 3.9659 | 3.9660 | 3.9660 | 3.9661 |
| | 34 | 10 | 3.9661 | 3.9662 | 3.9662 | 3.9663 | 3.9663 | 3.9664 | 3.9664 | 3.9665 | 3.9665 | 3.9665 |
| | 34 | 20 | 3.9666 | 3.9666 | 3.9667 | 3.9667 | 3.9668 | 3.9668 | 3.9669 | 3.9669 | 3.9670 | 3.9670 |
| | 34 | 30 | 3.9671 | 3.9671 | 3.9672 | 3.9672 | 3.9672 | 3.9673 | 3.9673 | 3.9674 | 3.9674 | 3.9675 |
| | 34 | 40 | 3.9675 | 3.9676 | 3.9676 | 3.9677 | 3.9677 | 3.9678 | 3.9678 | 3.9679 | 3.9679 | 3.9680 |
| | 34 | 50 | 3.9680 | 3.9681 | 3.9681 | 3.9682 | 3.9682 | 3.9682 | 3.9683 | 3.9683 | 3.9684 | 3.9684 |
| 2 | 35 | 0 | 3.9685 | 3.9685 | 3.9686 | 3.9686 | 3.9687 | 3.9687 | 3.9688 | 3.9688 | 3.9689 | 3.9689 |
| | 35 | 10 | 3.9689 | 3.9690 | 3.9690 | 3.9691 | 3.9691 | 3.9692 | 3.9692 | 3.9693 | 3.9693 | 3.9694 |
| | 35 | 20 | 3.9694 | 3.9695 | 3.9695 | 3.9696 | 3.9696 | 3.9696 | 3.9697 | 3.9697 | 3.9698 | 3.9698 |
| | 35 | 30 | 3.9699 | 3.9699 | 3.9700 | 3.9700 | 3.9701 | 3.9701 | 3.9702 | 3.9702 | 3.9703 | 3.9703 |
| | 35 | 40 | 3.9703 | 3.9704 | 3.9704 | 3.9705 | 3.9705 | 3.9706 | 3.9706 | 3.9707 | 3.9707 | 3.9708 |
| | 35 | 50 | 3.9708 | 3.9709 | 3.9709 | 3.9710 | 3.9710 | 3.9710 | 3.9711 | 3.9711 | 3.9712 | 3.9712 |
| 2 | 36 | 0 | 3.9713 | 3.9713 | 3.9714 | 3.9714 | 3.9715 | 3.9715 | 3.9716 | 3.9716 | 3.9716 | 3.9717 |
| | 36 | 10 | 3.9717 | 3.9718 | 3.9718 | 3.9719 | 3.9719 | 3.9720 | 3.9720 | 3.9721 | 3.9721 | 3.9722 |
| | 36 | 20 | 3.9722 | 3.9722 | 3.9723 | 3.9723 | 3.9724 | 3.9724 | 3.9725 | 3.9725 | 3.9726 | 3.9726 |
| | 36 | 30 | 3.9727 | 3.9727 | 3.9728 | 3.9728 | 3.9729 | 3.9729 | 3.9729 | 3.9730 | 3.9730 | 3.9731 |
| | 36 | 40 | 3.9731 | 3.9732 | 3.9732 | 3.9733 | 3.9733 | 3.9734 | 3.9734 | 3.9735 | 3.9735 | 3.9735 |
| | 36 | 50 | 3.9736 | 3.9736 | 3.9737 | 3.9737 | 3.9738 | 3.9738 | 3.9739 | 3.9739 | 3.9740 | 3.9740 |
| 2 | 37 | 0 | 3.9741 | 3.9741 | 3.9741 | 3.9742 | 3.9742 | 3.9743 | 3.9743 | 3.9744 | 3.9744 | 3.9745 |
| | 37 | 10 | 3.9745 | 3.9746 | 3.9746 | 3.9746 | 3.9747 | 3.9747 | 3.9748 | 3.9748 | 3.9749 | 3.9749 |
| | 37 | 20 | 3.9750 | 3.9750 | 3.9751 | 3.9751 | 3.9752 | 3.9752 | 3.9752 | 3.9753 | 3.9753 | 3.9754 |
| | 37 | 30 | 3.9754 | 3.9755 | 3.9755 | 3.9756 | 3.9756 | 3.9757 | 3.9757 | 3.9758 | 3.9758 | 3.9758 |
| | 37 | 40 | 3.9759 | 3.9759 | 3.9760 | 3.9760 | 3.9761 | 3.9761 | 3.9762 | 3.9762 | 3.9763 | 3.9763 |
| | 37 | 50 | 3.9763 | 3.9764 | 3.9764 | 3.9765 | 3.9765 | 3.9766 | 3.9766 | 3.9767 | 3.9767 | 3.9768 |
| 2 | 38 | 0 | 3.9768 | 3.9769 | 3.9769 | 3.9769 | 3.9770 | 3.9770 | 3.9771 | 3.9771 | 3.9772 | 3.9772 |
| | 38 | 10 | 3.9773 | 3.9773 | 3.9774 | 3.9774 | 3.9774 | 3.9775 | 3.9775 | 3.9776 | 3.9776 | 3.9777 |
| | 38 | 20 | 3.9777 | 3.9778 | 3.9778 | 3.9779 | 3.9779 | 3.9779 | 3.9780 | 3.9780 | 3.9781 | 3.9781 |
| | 38 | 30 | 3.9782 | 3.9782 | 3.9783 | 3.9783 | 3.9784 | 3.9784 | 3.9785 | 3.9785 | 3.9785 | 3.9786 |
| | 38 | 40 | 3.9786 | 3.9787 | 3.9787 | 3.9788 | 3.9788 | 3.9789 | 3.9889 | 3.9790 | 3.9790 | 3.9790 |
| | 38 | 50 | 3.9791 | 3.9791 | 3.9792 | 3.9792 | 3.9793 | 3.9793 | 3.9794 | 3.9794 | 3.9795 | 3.9795 |
| 2 | 39 | 0 | 3.9795 | 3.9796 | 3.9796 | 3.9797 | 3.9797 | 3.9798 | 3.9798 | 3.9799 | 3.9799 | 3.9800 |
| | 39 | 10 | 3.9800 | 3.9800 | 3.9801 | 3.9801 | 3.9802 | 3.9802 | 3.9803 | 3.9803 | 3.9804 | 3.9804 |
| | 39 | 20 | 3.9805 | 3.9805 | 3.9805 | 3.9806 | 3.9806 | 3.9807 | 3.9807 | 3.9808 | 3.9808 | 3.9809 |
| | 39 | 30 | 3.9809 | 3.9810 | 3.9810 | 3.9810 | 3.9811 | 3.9811 | 3.9812 | 3.9812 | 3.9813 | 3.9813 |
| | 39 | 40 | 3.9814 | 3.9814 | 3.9815 | 3.9815 | 3.9815 | 3.9816 | 3.9816 | 3.9817 | 3.9817 | 3.9818 |
| | 39 | 50 | 3.9818 | 3.9819 | 3.9819 | 3.9819 | 3.9820 | 3.9820 | 3.9821 | 3.9821 | 3.9822 | 3.9822 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{2}{}^{h}\ \overset{\prime}{40}{}^{m}\ \overset{\prime\prime}{0}{}^{s}$ | 3.9823 | 3.9823 | 3.9824 | 3.9824 | 3.9825 | 3.9825 | 3.9825 | 3.9826 | 3.9826 | 3.9827 |
| 40 10 | 3.9827 | 3.9828 | 3.9828 | 3.9829 | 3.9829 | 3.9829 | 3.9830 | 3.9830 | 3.9831 | 3.9831 |
| 40 20 | 3.9832 | 3.9832 | 3.9833 | 3.9833 | 3.9834 | 3.9834 | 3.9834 | 3.9835 | 3.9835 | 3.9836 |
| 40 30 | 3.9836 | 3.9837 | 3.9837 | 3.9838 | 3.9838 | 3.9839 | 3.9839 | 3.9839 | 3.9840 | 3.9840 |
| 40 40 | 3.9841 | 3.9841 | 3.9842 | 3.9842 | 3.9843 | 3.9843 | 3.9843 | 3.9844 | 3.9844 | 3.9845 |
| 40 50 | 3.9845 | 3.9846 | 3.9846 | 3.9847 | 3.9847 | 3.9848 | 3.9848 | 3.9848 | 3.9849 | 3.9849 |
| 2 41 0 | 3.9850 | 3.9850 | 3.9851 | 3.9851 | 3.9852 | 3.9852 | 3.9852 | 3.9853 | 3.9853 | 3.9854 |
| 41 10 | 3.9854 | 3.9855 | 3.9855 | 3.9856 | 3.9856 | 3.9857 | 3.9857 | 3.9857 | 3.9858 | 3.9858 |
| 41 20 | 3.9859 | 3.9859 | 3.9860 | 3.9860 | 3.9861 | 3.9861 | 3.9861 | 3.9862 | 3.9862 | 3.9863 |
| 41 30 | 3.9863 | 3.9864 | 3.9864 | 3.9865 | 3.9865 | 3.9865 | 3.9866 | 3.9866 | 3.9867 | 3.9867 |
| 41 40 | 3.9868 | 3.9868 | 3.9869 | 3.9869 | 3.9870 | 3.9870 | 3.9870 | 3.9871 | 3.9871 | 3.9872 |
| 41 50 | 3.9872 | 3.9873 | 3.9873 | 3.9874 | 3.9874 | 3.9874 | 3.9875 | 3.9875 | 3.9876 | 3.9876 |
| 2 42 0 | 3.9877 | 3.9877 | 3.9878 | 3.9878 | 3.9878 | 3.9879 | 3.9879 | 3.9880 | 3.9880 | 3.9881 |
| 42 10 | 3.9881 | 3.9882 | 3.9882 | 3.9882 | 3.9883 | 3.9883 | 3.9884 | 3.9884 | 3.9885 | 3.9885 |
| 42 20 | 3.9886 | 3.9886 | 3.9886 | 3.9887 | 3.9887 | 3.9888 | 3.9888 | 3.9889 | 3.9889 | 3.9890 |
| 42 30 | 3.9890 | 3.9890 | 3.9891 | 3.9891 | 3.9892 | 3.9892 | 3.9893 | 3.9893 | 3.9894 | 3.9894 |
| 42 40 | 3.9894 | 3.9895 | 3.9895 | 3.9896 | 3.9896 | 3.9897 | 3.9897 | 3.9898 | 3.9898 | 3.9898 |
| 42 50 | 3.9899 | 3.9899 | 3.9900 | 3.9900 | 3.9901 | 3.9901 | 3.9902 | 3.9902 | 3.9903 | 3.9903 |
| 2 43 0 | 3.9903 | 3.9904 | 3.9904 | 3.9905 | 3.9905 | 3.9906 | 3.9906 | 3.9906 | 3.9907 | 3.9907 |
| 43 10 | 3.9908 | 3.9908 | 3.9909 | 3.9909 | 3.9910 | 3.9910 | 3.9910 | 3.9911 | 3.9911 | 3.9912 |
| 43 20 | 3.9912 | 3.9913 | 3.9913 | 3.9914 | 3.9914 | 3.9914 | 3.9915 | 3.9915 | 3.9916 | 3.9916 |
| 43 30 | 3.9917 | 3.9917 | 3.9918 | 3.9918 | 3.9918 | 3.9919 | 3.9919 | 3 9920 | 3.9920 | 3.9921 |
| 43 40 | 3.9921 | 3.9922 | 3.9922 | 3.9922 | 3.9923 | 3.9923 | 3.9924 | 3.9924 | 3.9925 | 3.9925 |
| 43 50 | 3.9926 | 3.9926 | 3.9926 | 3.9927 | 3.9927 | 3.9928 | 3.9928 | 3.9929 | 3.9929 | 3.9930 |
| 2 44 0 | 3.9930 | 3.9930 | 3.9931 | 3.9931 | 3.9932 | 3.9932 | 3.9933 | 3.9933 | 3.9933 | 3.9934 |
| 44 10 | 3.9934 | 3.9935 | 3.9935 | 3.9936 | 3.9936 | 3.9937 | 3.9937 | 3.9937 | 3.9938 | 3.9938 |
| 44 20 | 3.9939 | 3.9939 | 3.9940 | 3.9940 | 3.9941 | 3.9941 | 3.9941 | 3.9942 | 3.9942 | 3.9943 |
| 44 30 | 3.9943 | 3.9944 | 3.9944 | 3.9944 | 3.9945 | 3.9945 | 3.9946 | 3.9946 | 3.9947 | 3.9947 |
| 44 40 | 3.9948 | 3.9948 | 3.9948 | 3.9949 | 3.9949 | 3.9950 | 3.9950 | 3.9951 | 3.9951 | 3.9952 |
| 44 50 | 3.9952 | 3.9952 | 3.9953 | 3.9953 | 3.9954 | 3 9954 | 3.9955 | 3.9955 | 3.9955 | 3.9956 |
| 2 45 0 | 3.9956 | 3.9957 | 3.9957 | 3.9958 | 3.9958 | 3.9959 | 3.9959 | 3.9959 | 3.9960 | 3.9960 |
| 45 10 | 3.9961 | 3.9961 | 3.9962 | 3.9962 | 3.9962 | 3.9963 | 3.9963 | 3.9964 | 3.9964 | 3.9965 |
| 45 20 | 3.9965 | 3.9966 | 3.9966 | 3.9966 | 3.9967 | 3.9967 | 3.9968 | 3.9968 | 3.9969 | 3.9969 |
| 45 30 | 3.9969 | 3.9970 | 3.9970 | 3.9971 | 3.9971 | 3.9972 | 3.9972 | 3.9973 | 3.9973 | 3.9973 |
| 45 40 | 3.9974 | 3.9974 | 3.9975 | 3.9975 | 3.9976 | 3.9976 | 3.9976 | 3.9977 | 3.9977 | 3.9978 |
| 45 50 | 3.9978 | 3.9979 | 3.9979 | 3.9980 | 3.9980 | 3.9980 | 3.9981 | 3.9981 | 3.9982 | 3.9982 |
| 2 46 0 | 3.9983 | 3.9983 | 3.9983 | 3.9984 | 3.9984 | 3.9985 | 3.9985 | 3.9986 | 3.9986 | 3.9987 |
| 46 10 | 3.9987 | 3.9987 | 3.9988 | 3.9988 | 3.9989 | 3.9989 | 3.9990 | 3.9990 | 3.9990 | 3.9991 |
| 46 20 | 3.9991 | 3.9992 | 3.9992 | 3.9993 | 3.9993 | 3.9993 | 3.9994 | 3.9994 | 3.9995 | 3.9995 |
| 46 30 | 3.9996 | 3.9996 | 3.9997 | 3.9997 | 3.9997 | 3.9998 | 3.9998 | 3.9999 | 3.9999 | 4.0000 |
| 46 40 | 4.0000 | 4.0000 | 4.0001 | 4.0001 | 4.0002 | 4.0002 | 4.0003 | 4.0003 | 4 0003 | 4.0004 |
| 46 50 | 4.0004 | 4.0005 | 4.0005 | 4.0006 | 4.0006 | 4.0007 | 4.0007 | 4.0007 | 4.0008 | 4.0008 |
| 2 47 0 | 4.0009 | 4.0009 | 4.0010 | 4.0010 | 4.0010 | 4.0011 | 4.0011 | 4.0012 | 4.0012 | 4.0013 |
| 47 10 | 4.0013 | 4.0013 | 4.0014 | 4.0014 | 4.0015 | 4.0015 | 4.0016 | 4.0016 | 4.0016 | 4.0017 |
| 47 20 | 4.0017 | 4.0018 | 4.0018 | 4.0019 | 4.0019 | 4.0019 | 4.0020 | 4.0020 | 4.0021 | 4.0021 |
| 47 30 | 4.0022 | 4.0022 | 4.0023 | 4.0023 | 4.0023 | 4.0024 | 4.0024 | 4.0025 | 4.0025 | 4.0026 |
| 47 40 | 4.0026 | 4.0026 | 4.0027 | 4.0027 | 4.0028 | 4.0028 | 4.0029 | 4.0029 | 4.0029 | 4.0030 |
| 47 50 | 4.0030 | 4.0031 | 4.0031 | 4.0032 | 4.0032 | 4.0032 | 4.0033 | 4.0033 | 4.0034 | 4.0034 |
| 2 48 0 | 4.0035 | 4.0035 | 4.0035 | 4.0036 | 4.0036 | 4.0037 | 4.0037 | 4.0038 | 4.0038 | 4.0038 |
| 48 10 | 4.0039 | 4.0039 | 4.0040 | 4.0040 | 4.0041 | 4.0041 | 4.0041 | 4.0042 | 4.0042 | 4.0043 |
| 48 20 | 4.0043 | 4.0044 | 4.0044 | 4.0045 | 4.0045 | 4.0045 | 4.0046 | 4.0046 | 4.0047 | 4.0047 |
| 48 30 | 4.0048 | 4.0048 | 4.0048 | 4.0049 | 4.0049 | 4.0050 | 4.0050 | 4.0051 | 4.0051 | 4.0051 |
| 48 40 | 4.0052 | 4.0052 | 4.0053 | 4.0053 | 4.0054 | 4.0054 | 4.0054 | 4.0055 | 4.0055 | 4.0056 |
| 48 50 | 4.0056 | 4.0057 | 4.0057 | 4.0057 | 4.0058 | 4.0058 | 4.0059 | 4.0059 | 4.0060 | 4.0060 |
| 2 49 0 | 4.0060 | 4.0061 | 4.0061 | 4.0062 | 4.0062 | 4.0063 | 4.0063 | 4.0063 | 4.0064 | 4.0064 |
| 49 10 | 4.0065 | 4.0065 | 4.0066 | 4.0066 | 4.0066 | 4.0067 | 4.0067 | 4.0068 | 4.0068 | 4.0069 |
| 49 20 | 4.0069 | 4.0069 | 4.0070 | 4.0070 | 4.0071 | 4.0071 | 4.0072 | 4.0072 | 4.0072 | 4.0073 |
| 49 30 | 4.0073 | 4.0074 | 4.0074 | 4.0074 | 4.0075 | 4.0075 | 4.0076 | 4.0076 | 4.0077 | 4.0077 |
| 49 40 | 4.0077 | 4.0078 | 4.0078 | 4.0079 | 4.0079 | 4.0080 | 4.0080 | 4.0080 | 4.0081 | 4.0081 |
| 49 50 | 4.0082 | 4.0082 | 4.0083 | 4.0083 | 4.0083 | 4.0084 | 4.0084 | 4.0085 | 4.0085 | 4.0086 |

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

| Arc. | | | 0″ | 1″ | 2″ | 3″ | 4″ | 5″ | 6″ | 7″ | 8″ | 9″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\overset{\circ}{2}{}^{h}$ | $\overset{\prime}{50}{}^{m}$ | $\overset{\prime\prime}{0}{}^{s}$ | 4.0086 | 4.0086 | 4.0087 | 4.0087 | 4.0088 | 4.0088 | 4.0089 | 4.0089 | 4.0089 | 4.0090 |
| | 50 | 10 | 4.0090 | 4.0091 | 4.0091 | 4.0092 | 4.0092 | 4.0092 | 4.0093 | 4.0093 | 4.0094 | 4.0094 |
| | 50 | 20 | 4.0095 | 4.0095 | 4.0095 | 4.0096 | 4.0096 | 4.0097 | 4.0097 | 4.0097 | 4.0098 | 4.0098 |
| | 50 | 30 | 4.0099 | 4.0099 | 4.0100 | 4.0100 | 4.0100 | 4.0101 | 4.0101 | 4.0102 | 4.0102 | 4.0103 |
| | 50 | 40 | 4.0103 | 4.0103 | 4.0104 | 4.0104 | 4.0105 | 4.0105 | 4.0106 | 4.0106 | 4.0106 | 4.0107 |
| | 50 | 50 | 4.0107 | 4.0108 | 4.0108 | 4.0109 | 4.0109 | 4.0109 | 4.0110 | 4.0110 | 4.0111 | 4.0111 |
| 2 | 51 | 0 | 4.0111 | 4.0112 | 4.0112 | 4.0113 | 4.0113 | 4.0114 | 4.0114 | 4.0114 | 4.0115 | 4.0115 |
| | 51 | 10 | 4.0116 | 4.0116 | 4.0117 | 4.0117 | 4.0117 | 4.0118 | 4.0118 | 4.0119 | 4.0119 | 4.0120 |
| | 51 | 20 | 4.0120 | 4.0120 | 4.0121 | 4.0121 | 4.0122 | 4.0122 | 4.0122 | 4.0123 | 4.0123 | 4.0124 |
| | 51 | 30 | 4.0124 | 4.0125 | 4.0125 | 4.0125 | 4.0126 | 4.0126 | 4.0127 | 4.0127 | 4.0128 | 4.0128 |
| | 51 | 40 | 4.0128 | 4.0129 | 4.0129 | 4.0130 | 4.0130 | 4.0130 | 4.0131 | 4.0131 | 4.0132 | 4.0132 |
| | 51 | 50 | 4.0133 | 4.0133 | 4.0133 | 4.0134 | 4.0134 | 4.0135 | 4.0135 | 4.0136 | 4.0136 | 4.0136 |
| 2 | 52 | 0 | 4.0137 | 4.0137 | 4.0138 | 4.0138 | 4.0138 | 4.0139 | 4.0139 | 4.0140 | 4.0140 | 4.0141 |
| | 52 | 10 | 4.0141 | 4.0141 | 4.0142 | 4.0142 | 4.0143 | 4.0143 | 4.0144 | 4.0144 | 4.0144 | 4.0145 |
| | 52 | 20 | 4.0145 | 4.0146 | 4.0146 | 4.0146 | 4.0147 | 4.0147 | 4.0148 | 4.0148 | 4.0149 | 4.0149 |
| | 52 | 30 | 4.0149 | 4.0150 | 4.0150 | 4.0151 | 4.0151 | 4.0152 | 4.0152 | 4.0153 | 4.0153 | 4.0153 |
| | 52 | 40 | 4.0154 | 4.0154 | 4.0154 | 4.0155 | 4.0155 | 4.0156 | 4.0156 | 4.0157 | 4.0157 | 4.0157 |
| | 52 | 50 | 4.0158 | 4.0158 | 4.0159 | 4.0159 | 4.0159 | 4.0160 | 4.0160 | 4.0161 | 4.0161 | 4.0162 |
| 2 | 53 | 0 | 4.0162 | 4.0162 | 4.0163 | 4.0163 | 4.0164 | 4.0164 | 4.0164 | 4.0165 | 4.0165 | 4.0166 |
| | 53 | 10 | 4.0166 | 4.0167 | 4.0167 | 4.0167 | 4.0168 | 4.0168 | 4.0169 | 4.0169 | 4.0169 | 4.0170 |
| | 53 | 20 | 4.0170 | 4.0171 | 4.0171 | 4.0172 | 4.0172 | 4.0172 | 4.0173 | 4.0173 | 4.0174 | 4.0174 |
| | 53 | 30 | 4.0175 | 4.0175 | 4.0175 | 4.0176 | 4.0176 | 4.0177 | 4.0177 | 4.0177 | 4.0178 | 4.0178 |
| | 53 | 40 | 4.0179 | 4.0179 | 4.0180 | 4.0180 | 4.0180 | 4.0181 | 4.0181 | 4.0182 | 4.0182 | 4.0182 |
| | 53 | 50 | 4.0183 | 4.0183 | 4.0184 | 4.0184 | 4.0185 | 4.0185 | 4.0185 | 4.0186 | 4.0186 | 4.0187 |
| 2 | 54 | 0 | 4.0187 | 4.0187 | 4.0188 | 4.0188 | 4.0189 | 4.0189 | 4.0190 | 4.0190 | 4.0190 | 4.0191 |
| | 54 | 10 | 4.0191 | 4.0192 | 4.0192 | 4.0192 | 4.0193 | 4.0193 | 4.0194 | 4.0194 | 4.0194 | 4.0195 |
| | 54 | 20 | 4.0195 | 4.0196 | 4.0196 | 4.0197 | 4.0197 | 4.0197 | 4.0198 | 4.0198 | 4.0199 | 4.0199 |
| | 54 | 30 | 4.0199 | 4.0200 | 4.0200 | 4.0201 | 4.0201 | 4.0202 | 4.0202 | 4.0202 | 4.0203 | 4.0203 |
| | 54 | 40 | 4.0204 | 4.0204 | 4.0204 | 4.0205 | 4.0205 | 4.0206 | 4.0206 | 4.0207 | 4.0207 | 4.0207 |
| | 54 | 50 | 4.0208 | 4.0208 | 4.0209 | 4.0209 | 4.0209 | 4.0210 | 4.0210 | 4.0211 | 4.0211 | 4.0211 |
| 2 | 55 | 0 | 4.0212 | 4.0212 | 4.0213 | 4.0213 | 4.0214 | 4.0214 | 4.0214 | 4.0215 | 4.0215 | 4.0216 |
| | 55 | 10 | 4.0216 | 4.0216 | 4.0217 | 4.0217 | 4.0218 | 4.0218 | 4.0219 | 4.0219 | 4.0219 | 4.0220 |
| | 55 | 20 | 4.0220 | 4.0221 | 4.0221 | 4.0221 | 4.0222 | 4.0222 | 4.0223 | 4.0223 | 4.0223 | 4.0224 |
| | 55 | 30 | 4.0224 | 4 0225 | 4.0225 | 4.0225 | 4.0226 | 4.0226 | 4.0227 | 4.0227 | 4.0228 | 4.0228 |
| | 55 | 40 | 4.0228 | 4.0229 | 4.0229 | 4.0230 | 4.0230 | 4.0230 | 4.0231 | 4.0231 | 4.0232 | 4.0232 |
| | 55 | 50 | 4.0233 | 4.0233 | 4.0233 | 4.0234 | 4.0234 | 4.0235 | 4.0235 | 4.0235 | 4.0236 | 4.0236 |
| 2 | 56 | 0 | 4.0237 | 4.0237 | 4.0237 | 4.0238 | 4.0238 | 4.0239 | 4.0239 | 4.0240 | 4 0240 | 4.0240 |
| | 56 | 10 | 4.0241 | 4.0241 | 4.0242 | 4.0242 | 4.0242 | 4.0243 | 4.0243 | 4.0244 | 4.0244 | 4.0244 |
| | 56 | 20 | 4.0245 | 4.0245 | 4.0246 | 4.0246 | 4.0246 | 4.0247 | 4.0247 | 4.0248 | 4.0248 | 4.0249 |
| | 56 | 30 | 4.0249 | 4.0249 | 4.0250 | 4.0250 | 4.0251 | 4.0251 | 4.0251 | 4.0252 | 4.0252 | 4.0253 |
| | 56 | 40 | 4.0253 | 4.0253 | 4.0254 | 4.0254 | 4.0255 | 4.0255 | 4.0256 | 4.0256 | 4.0256 | 4.0257 |
| | 56 | 50 | 4.0257 | 4.0258 | 4.0258 | 4.0258 | 4.0259 | 4.0259 | 4.0260 | 4.0260 | 4.0260 | 4.0261 |
| 2 | 57 | 0 | 4.0261 | 4.0262 | 4.0262 | 4.0262 | 4.0263 | 4.0263 | 4.0264 | 4.0264 | 4.0265 | 4.0265 |
| | 57 | 10 | 4.0265 | 4.0266 | 4.0266 | 4.0267 | 4.0267 | 4.0267 | 4.0268 | 4.0268 | 4.0269 | 4.0269 |
| | 57 | 20 | 4.0269 | 4.0270 | 4.0270 | 4.0271 | 4.0271 | 4.0271 | 4.0272 | 4.0272 | 4.0273 | 4.0273 |
| | 57 | 30 | 4.0273 | 4.0274 | 4.0274 | 4.0275 | 4.0275 | 4.0276 | 4.0276 | 4.0276 | 4.0277 | 4.0277 |
| | 57 | 40 | 4.0278 | 4.0278 | 4.0278 | 4.0279 | 4.0279 | 4.0280 | 4.0280 | 4.0280 | 4.0281 | 4.0281 |
| | 57 | 50 | 4.0282 | 4.0282 | 4.0282 | 4.0283 | 4.0283 | 4.0284 | 4.0284 | 4.0284 | 4.0285 | 4.0285 |
| 2 | 58 | 0 | 4.0286 | 4.0286 | 4 0287 | 4.0287 | 4.0287 | 4.0288 | 4.0288 | 4.0289 | 4.0289 | 4.0289 |
| | 58 | 10 | 4.0290 | 4.0290 | 4.0291 | 4.0291 | 4.0291 | 4.0292 | 4.0292 | 4.0293 | 4.0293 | 4.0293 |
| | 58 | 20 | 4.0294 | 4.0294 | 4.0295 | 4.0295 | 4.0295 | 4.0296 | 4.0296 | 4.0297 | 4.0297 | 4.0297 |
| | 58 | 30 | 4.0298 | 4.0298 | 4.0299 | 4.0299 | 4.0300 | 4.0300 | 4.0300 | 4.0301 | 4.0301 | 4.0302 |
| | 58 | 40 | 4.0302 | 4.0302 | 4.0303 | 4.0303 | 4.0304 | 4.0304 | 4.0304 | 4.0305 | 4.0305 | 4.0306 |
| | 58 | 50 | 4.0306 | 4.0306 | 4.0307 | 4.0307 | 4.0308 | 4.0308 | 4.0308 | 4.0309 | 4.0309 | 4.0310 |
| 2 | 59 | 0 | 4.0310 | 4.0310 | 4.0311 | 4.0311 | 4.0312 | 4.0312 | 4.0312 | 4.0313 | 4.0313 | 4.0314 |
| | 59 | 10 | 4.0314 | 4.0314 | 4.0315 | 4.0315 | 4.0316 | 4.0316 | 4.0317 | 4.0317 | 4.0317 | 4.0318 |
| | 59 | 20 | 4.0318 | 4.0319 | 4.0319 | 4.0319 | 4.0320 | 4.0320 | 4.0321 | 4.0321 | 4.0321 | 4.0322 |
| | 59 | 30 | 4.0322 | 4.0323 | 4.0323 | 4.0323 | 4.0324 | 4.0324 | 4.0325 | 4.0325 | 4.0325 | 4.0326 |
| | 59 | 40 | 4.0326 | 4.0327 | 4.0327 | 4.0327 | 4.0328 | 4.0328 | 4.0329 | 4.0329 | 4.0329 | 4.0330 |
| | 59 | 50 | 4.0330 | 4.0331 | 4.0331 | 4.0331 | 4.0332 | 4.0332 | 4.0333 | 4.0333 | 4.0333 | 4.0334 |

# TABLE III. CHAUVENET'S METHOD.

## LOG. *N* FOR DISTANCES FROM THE SUN.

| 1856. | $0^{h}$ | $3^{h}$ | $6^{h}$ | $9^{h}$ | $12^{h}$ | $15^{h}$ | $18^{h}$ | $21^{h}$ | 1856. | $0^{h}$ | $3^{h}$ | $6^{h}$ | $9^{h}$ | $12^{h}$ | $15^{h}$ | $18^{h}$ | $21^{h}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. 1 | —0.91 | 0.90 | 0.90 | 0.89 | 0.89 | 0.88 | 0.88 | 0.88 | Mar. 30 | +0.57 | 0.60 | 0.64 | 0.67 | 0.69 | 0.72 | 0.75 | 0.77 |
| 2 | 0.86 | .85 | .84 | .83 | .82 | .81 | .79 | .79 | 31 | 0.79 | .81 | .83 | .85 | .87 | .88 | 0.90 | 0.91 |
| 3 | 0.76 | .75 | .73 | .71 | .69 | .66 | .64 | .61 | Apr. 1 | 0.93 | 0.94 | 0.96 | 0.97 | 0.98 | 0.99 | 1.00 | 1.01 |
| 4 | 0.57 | .54 | .50 | .45 | .39 | .32 | .25 | .18 | 2 | +1.02 | 1.03 | 1.04 | 1.04 | 1.05 | 1.06 | 1.06 | 1.07 |
| 9 | 0.09 | .25 | .38 | .47 | .54 | .58 | .64 | .69 | 7 | —0.88 | 0.86 | 0.85 | 0.83 | 0.81 | 0.79 | 0.78 | 0.75 |
| 10 | —0.72 | .74 | .77 | .79 | .81 | .83 | .85 | .86 | 8 | —0.73 | .70 | .68 | .65 | .62 | .59 | .55 | .51 |
| 11 | 0.88 | .90 | .90 | .91 | .91 | .92 | .93 | 0.94 | 9 | —0.47 | .42 | .37 | .30 | .24 | .12 | .05 | 9.80 |
| 12 | 0.94 | 0.94 | .95 | .95 | .95 | .95 | .96 | 1.00 | 11 | +0.26 | .32 | .38 | .42 | .46 | .50 | .54 | .57 |
| 13 | 1.06 | 1.01 | .95 | .95 | .95 | .95 | .94 | 0.94 | 12 | 0.60 | .62 | .65 | .67 | .69 | .71 | .73 | .75 |
| 14 | 0.93 | 0.93 | .92 | .91 | .91 | .90 | .89 | .88 | 13 | 0.76 | .79 | .80 | .81 | .82 | .83 | .85 | .86 |
| 15 | —0.87 | .86 | .85 | .83 | .81 | .80 | .79 | .78 | 14 | +0.87 | .88 | .89 | .90 | .91 | .91 | 0.92 | 0.93 |
| 16 | 0.76 | .74 | .72 | .69 | .67 | .64 | .61 | .58 | 24 | —0.43 | .37 | .33 | .25 | .18 | .04 | 9.97 | 9.74 |
| 17 | 0.55 | .51 | .46 | .39 | .35 | .30 | .20 | .11 | 26 | +0.33 | .39 | .44 | .49 | .53 | .56 | 0.60 | 0.63 |
| 26 | 0.88 | .88 | .89 | .89 | .90 | .90 | .90 | .91 | 27 | 0.66 | .68 | .71 | .74 | .77 | .78 | .80 | .81 |
| 27 | 0.91 | .91 | .91 | .91 | .91 | .91 | .91 | .91 | 28 | 0.83 | .85 | .86 | .87 | .89 | .90 | .91 | .92 |
| 28 | —0.91 | .91 | .91 | .90 | .90 | .90 | .89 | .89 | 29 | +0.93 | 0.94 | 0.95 | 0.96 | 0.97 | 0.98 | 0.98 | 0.99 |
| 29 | 0.88 | .87 | .87 | .86 | .86 | .85 | .84 | .82 | 30 | 1.00 | 1.00 | 1.01 | 1.01 | 1.01 | 1.01 | 1.02 | 1.02 |
| 30 | 0.81 | .80 | .79 | .78 | .76 | .75 | .74 | .72 | May 1 | +0.02 | 1.02 | 1.02 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 |
| 31 | 0.70 | .68 | .66 | .64 | .61 | .58 | .55 | 0.52 | 6 | —0.77 | 0.74 | 0.70 | 0.66 | 0.63 | 0.59 | 0.55 | 0.49 |
| Feb. 1 | —0.48 | .43 | .38 | .33 | .26 | .19 | .07 | 9.89 | 7 | 0.44 | .38 | .32 | .22 | .14 | .01 | 9.88 | 9.31 |
| 3 | +0.41 | .47 | .53 | .59 | .64 | .69 | .72 | 0.77 | 9 | +0.38 | .42 | .46 | .51 | .55 | .57 | 0.60 | 0.63 |
| 8 | —0.85 | .87 | .89 | .90 | .91 | .92 | .93 | .95 | 10 | 0.65 | .67 | .69 | .71 | .73 | .75 | .76 | .78 |
| 9 | 0.97 | .95 | .94 | .94 | .95 | .95 | .95 | .94 | 11 | 0.79 | .81 | .82 | .83 | .84 | .85 | .86 | .87 |
| 10 | 0.94 | .94 | .94 | .93 | .93 | .92 | .92 | .91 | 12 | 0.88 | .88 | .89 | .90 | .90 | .91 | .92 | .92 |
| 11 | 0.90 | .89 | .88 | .87 | .86 | .85 | .84 | .83 | 13 | 0.93 | .93 | .93 | .94 | .94 | .94 | .95 | .95 |
| 12 | —0.81 | .79 | .77 | .76 | .75 | .73 | .71 | .68 | 14 | +0.95 | .95 | .95 | .96 | .96 | .96 | .95 | .95 |
| 13 | 0.66 | .63 | .60 | .57 | .54 | 0.50 | 0.46 | 0.42 | 23 | 9.52 | 9.77 | .01 | .13 | .23 | .31 | .37 | .43 |
| 14 | —0.36 | 0.31 | 0.24 | 0.16 | .06 | 9.96 | 9.73 | 9.30 | 24 | 0.48 | .52 | .56 | .60 | .63 | .66 | .68 | .71 |
| 15 | +8.88 | 9.41 | 9.84 | 9.99 | .12 | 0.20 | 0.29 | 0.37 | 25 | 0.73 | .75 | .77 | .79 | .81 | .82 | .84 | .85 |
| 25 | —0.89 | 0.88 | 0.88 | 0.87 | .87 | .86 | .86 | .85 | 26 | 0.87 | .88 | .89 | .90 | .91 | .92 | .93 | .94 |
| 26 | —0.84 | .84 | .83 | .82 | .81 | .80 | .79 | .78 | 27 | +0.94 | .95 | .96 | .96 | .97 | .97 | .98 | .98 |
| 27 | 0.76 | .75 | .74 | .72 | .71 | .68 | .64 | .64 | 28 | 0.98 | .98 | .98 | .98 | .99 | .99 | .98 | .98 |
| 28 | 0.62 | .60 | .57 | .55 | 0.51 | 0.47 | 0.43 | 0.38 | 29 | 0.97 | .97 | .97 | .97 | .97 | .96 | .95 | .95 |
| 29 | —0.33 | 0.27 | 0.20 | .12 | 9.99 | 9.79 | 9.58 | 9.36 | 30 | 0.94 | .93 | .92 | .91 | .90 | .88 | .87 | .85 |
| Mar. 1 | +9.40 | 9.57 | 9.77 | .03 | 0.20 | 0.28 | 0.31 | 0.41 | June 6 | 0.41 | .46 | .50 | .54 | .57 | .60 | .63 | .66 |
| 2 | +0.47 | 0.52 | 0.56 | .60 | .64 | .68 | .71 | .74 | 7 | +0.68 | .70 | .72 | .73 | .75 | .77 | .78 | .80 |
| 3 | 0.77 | .79 | .82 | 0.85 | 0.87 | 0.89 | 0.91 | 0.93 | 8 | 0.81 | .82 | .83 | .84 | .85 | .86 | .87 | .88 |
| 4 | +0.95 | .96 | .98 | 1.00 | 1.02 | 1.04 | 1.06 | 1.08 | 9 | 0.88 | .89 | .89 | .90 | .91 | .91 | .91 | .92 |
| 8 | —0.90 | .91 | .92 | 0.94 | 0.95 | 0.94 | 0.94 | 0.94 | 10 | 0.92 | .92 | .93 | .93 | .93 | .93 | .93 | .93 |
| 9 | 0.94 | .93 | .92 | .92 | .91 | .90 | .90 | .89 | 11 | 0.94 | .94 | .94 | .94 | .93 | .93 | .93 | .93 |
| 10 | —0.88 | .86 | .85 | .84 | .83 | .81 | .80 | .78 | 12 | +0.93 | .92 | .92 | .92 | .91 | .91 | .90 | .90 |
| 11 | 0.76 | .74 | .72 | .70 | .67 | .65 | .62 | .59 | 13 | 0.89 | .88 | .88 | .87 | .87 | .85 | .84 | .83 |
| 12 | —0.56 | .52 | .48 | .44 | .39 | .33 | .27 | .19 | 22 | 0.78 | .80 | .82 | .84 | .85 | .86 | .88 | .89 |
| 14 | +0.02 | .12 | .21 | .27 | .34 | .39 | .44 | .49 | 23 | 0.90 | .91 | .92 | .92 | .93 | .94 | .94 | .95 |
| 15 | 0.53 | .56 | .58 | .61 | .64 | .66 | .69 | .71 | 24 | 0.95 | .96 | .96 | .96 | .97 | .97 | .97 | .97 |
| 16 | +0.73 | .75 | .77 | .78 | .80 | .81 | .82 | .83 | 25 | +0.97 | .97 | .97 | .96 | .96 | .96 | .95 | .95 |
| 25 | —0.82 | .81 | .80 | .79 | .78 | .76 | .75 | .73 | 26 | 0.95 | .94 | .93 | .93 | .92 | .91 | .90 | .89 |
| 26 | 0.72 | .70 | .68 | .66 | .64 | .61 | .59 | .56 | 27 | 0.88 | .87 | .85 | .84 | .83 | .81 | .79 | .77 |
| 27 | —0.53 | .49 | .46 | .42 | .39 | .32 | .25 | .17 | 28 | 0.75 | .72 | .70 | .67 | .64 | .60 | .56 | .51 |
| 29 | +0.07 | 0.17 | 0.25 | 0.32 | 0.38 | 0.44 | 0.48 | 0.53 | July 4 | +0.29 | 0.37 | 0.44 | 0.50 | 0.54 | 0.58 | 0.61 | 0.64 |

# TABLE III. CHAUVENET'S METHOD.

## LOG. *N* FOR DISTANCES FROM THE SUN.

| 1856. | $0^{h.}$ | $3^{h.}$ | $6^{h.}$ | $9^{h.}$ | $12^{h.}$ | $15^{h.}$ | $18^{h.}$ | $21^{h.}$ | 1856. | $0^{h.}$ | $3^{h.}$ | $6^{h.}$ | $9^{h.}$ | $12^{h.}$ | $15^{h.}$ | $18^{h.}$ | $21^{h.}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| July 5 | +0.67 | 0.70 | 0.72 | 0.74 | 0.76 | 0.77 | 0.79 | 0.80 | Oct. 2 | +0.86 | 0.85 | 0.84 | 0.82 | 0.81 | 0.80 | 0.79 | 0.77 |
| 6 | 0.82 | .83 | .84 | .85 | .86 | .87 | .87 | .88 | 3 | 0.76 | .74 | .72 | .70 | .68 | .66 | .64 | .62 |
| 7 | 0.88 | .89 | .90 | .90 | .90 | .91 | .91 | .91 | 4 | 0.59 | .56 | .53 | .50 | 0.46 | 0.42 | 0.37 | 0.32 |
| 8 | 0.92 | .92 | .92 | .92 | .92 | .92 | .92 | .92 | 5 | +0.26 | 0.19 | .10 | .03 | 9.85 | 9.49 | 9.14 | 9.41 |
| 9 | 0.92 | .92 | .92 | .92 | .92 | .91 | .91 | .91 | 6 | —9.65 | 9.86 | .01 | .12 | 0.21 | 0.28 | 0.35 | 0.40 |
| 10 | +0.90 | .90 | .89 | .89 | .88 | .88 | .87 | .86 | 7 | —0.45 | 0.49 | .53 | .57 | .60 | .63 | .66 | .69 |
| 11 | 0.85 | .85 | .84 | .83 | .82 | .81 | .79 | .78 | 8 | 0.71 | .74 | .76 | .78 | .79 | .81 | .84 | .85 |
| 12 | 0.77 | .75 | .74 | .72 | .70 | .68 | .65 | .63 | 9 | —0.87 | .88 | .90 | .91 | .92 | .94 | .95 | .96 |
| 13 | 0.61 | .58 | .54 | .51 | .47 | .42 | .36 | .31 | 17 | +0.61 | .56 | .53 | .48 | .43 | .39 | .34 | .29 |
| 21 | 0.92 | .93 | .93 | .94 | .94 | .95 | .95 | .96 | 19 | —0.09 | .19 | .27 | .33 | .39 | .44 | .48 | .52 |
| 22 | +0.96 | .96 | .96 | .96 | .96 | .96 | .96 | .95 | 20 | —0.55 | .58 | .61 | .64 | .66 | .68 | .71 | .72 |
| 23 | 0.95 | .95 | .94 | .94 | .93 | .93 | .92 | .91 | 21 | 0.74 | .76 | .78 | .79 | .80 | .82 | .83 | .84 |
| 24 | 0.90 | .90 | .89 | .88 | .87 | .85 | .84 | .83 | 22 | 0.85 | .86 | .87 | .88 | .89 | .90 | .91 | .91 |
| 25 | 0.81 | .79 | .78 | .76 | .74 | .72 | .69 | .67 | 23 | 0.92 | .92 | .93 | .94 | .94 | .94 | .95 | .95 |
| 26 | +0.64 | .61 | .58 | .54 | .50 | .45 | .40 | .34 | 24 | 0.95 | .96 | .96 | .96 | .96 | .97 | 0.97 | 0.97 |
| 28 | —0.02 | .14 | .26 | .34 | .42 | .49 | .55 | .61 | 25 | —0.97 | .97 | .97 | .97 | .98 | .99 | 1.00 | 1.04 |
| Aug. 3 | +0.80 | .81 | .83 | .84 | .85 | .86 | .87 | .87 | Nov. 1 | +0.55 | .50 | .47 | .42 | .37 | .29 | 0.24 | 0.18 |
| 4 | 0.88 | .89 | .89 | .90 | .90 | .90 | .91 | .91 | 3 | —0.04 | .14 | .23 | .30 | .36 | .41 | .46 | .50 |
| 5 | 0.91 | .91 | .91 | .92 | .93 | .92 | .91 | .91 | 4 | 0.54 | .57 | .61 | .64 | .66 | .69 | .71 | .73 |
| 6 | 0.91 | .91 | .91 | .90 | .90 | .89 | .89 | .89 | 5 | 0.75 | .77 | .79 | .81 | .82 | .84 | .85 | .86 |
| 7 | +0.88 | .87 | .87 | .86 | .85 | .85 | .84 | .83 | 6 | —0.88 | .89 | .90 | .91 | .92 | .93 | .94 | .95 |
| 8 | 0.82 | .81 | .80 | .79 | .77 | .75 | .75 | .74 | 7 | 0.95 | .96 | .97 | .97 | .98 | .98 | .98 | .99 |
| 9 | 0.71 | .70 | .68 | .65 | .63 | .61 | .58 | .55 | 8 | 0.99 | .99 | .99 | .99 | .99 | .99 | .99 | .99 |
| 10 | 0.52 | .49 | .45 | .40 | .36 | .29 | .23 | .16 | 16 | 0.29 | .33 | .38 | .43 | .48 | .52 | .55 | .59 |
| 19 | 0.96 | .96 | .96 | .96 | .96 | .95 | .95 | .94 | 17 | 0.62 | .64 | .67 | .69 | .71 | .73 | .75 | .76 |
| 20 | +0.94 | .93 | .92 | .92 | .91 | .90 | .89 | .88 | 18 | —0.78 | .79 | .80 | .82 | .83 | .84 | .86 | .86 |
| 21 | 0.87 | .85 | .84 | .82 | .80 | .79 | .77 | .76 | 19 | 0.87 | .88 | .88 | .89 | .90 | .90 | .91 | .91 |
| 22 | 0.74 | .71 | .69 | .66 | .64 | .61 | .58 | 0.54 | 20 | 0.92 | .92 | .93 | .93 | .93 | .93 | .94 | .94 |
| 23 | +0.50 | .46 | .41 | .36 | .29 | .20 | .12 | 9.98 | 21 | 0.94 | .94 | .94 | .94 | .94 | .94 | .94 | .94 |
| 25 | —0.27 | .34 | .40 | .45 | .50 | .54 | .58 | 0.61 | 22 | 0.94 | .94 | .93 | .93 | .93 | .92 | .92 | .92 |
| 26 | —0.65 | .68 | .70 | .73 | .75 | .78 | .80 | .82 | 23 | —0.91 | .91 | .90 | .89 | .88 | .87 | .87 | .86 |
| 27 | —0.84 | .86 | .88 | .90 | .91 | .93 | .95 | .96 | 24 | 0.85 | .83 | .82 | .81 | .80 | .77 | .74 | .71 |
| Sept. 2 | +0.91 | .91 | .91 | .91 | .91 | .91 | .91 | .90 | Dec. 1 | 0.29 | .35 | .40 | .46 | .50 | .54 | .58 | .61 |
| 3 | 0.90 | .90 | .89 | .89 | .89 | .88 | .87 | .87 | 2 | 0.64 | .67 | .70 | .72 | .74 | .76 | .78 | .79 |
| 4 | 0.86 | .85 | .85 | .84 | .83 | .82 | .81 | .80 | 3 | 0.81 | .83 | .85 | .86 | .87 | .88 | .89 | .90 |
| 5 | +0.78 | .77 | .76 | .74 | .73 | .71 | .69 | .67 | 4 | —0.91 | .92 | .93 | .93 | .94 | .95 | .95 | .96 |
| 6 | 0.65 | .63 | .61 | .58 | .55 | .52 | 0.49 | 0.45 | 5 | 0.96 | .96 | .97 | .97 | .97 | .97 | .98 | .98 |
| 7 | +0.41 | .35 | .31 | .25 | .18 | .08 | 9.98 | 9.77 | 6 | 0.98 | .97 | .97 | .97 | .97 | .97 | .96 | .96 |
| 9 | —0.32 | .38 | .44 | .49 | .53 | .57 | 0.61 | 0.64 | 7 | 0.95 | .95 | .94 | 93 | .92 | .91 | .90 | .89 |
| 10 | —0.67 | .70 | .73 | .76 | .78 | .81 | .83 | .85 | 15 | 0.64 | .67 | .69 | .71 | .73 | .75 | .77 | .78 |
| 17 | +0.93 | .92 | .91 | .90 | .89 | .87 | .86 | .85 | 16 | —0.80 | .81 | .82 | .83 | .85 | .85 | .86 | .87 |
| 18 | 0.83 | .81 | .80 | .78 | .76 | .74 | .71 | .69 | 17 | 0.88 | .89 | .89 | .90 | .90 | .91 | .91 | .92 |
| 19 | 0.66 | .63 | .60 | .56 | 0.53 | 0.48 | 0.44 | 0.39 | 18 | 0.92 | .92 | .93 | .93 | .93 | .93 | .93 | .93 |
| 20 | +0.32 | 0.25 | .17 | .09 | 9.93 | 9.65 | 9.37 | 9.45 | 19 | 0.93 | .98 | .93 | .93 | .93 | .93 | .93 | .92 |
| 21 | —9.59 | 9.82 | .00 | .11 | 0.20 | 0.28 | 0.34 | 0.40 | 20 | 0.92 | .92 | .91 | .91 | .91 | .90 | .89 | .89 |
| 22 | —0.44 | 0.49 | .52 | .56 | .59 | .61 | .64 | .67 | 21 | —0.88 | .87 | .87 | .86 | .85 | .84 | .83 | .82 |
| 23 | 0.70 | .72 | .74 | .76 | .78 | .79 | .81 | .82 | 22 | 0.81 | .80 | .78 | .77 | .75 | .74 | .72 | .70 |
| 24 | 0.84 | .85 | .86 | .88 | .89 | .90 | .91 | .92 | 23 | 0.68 | .65 | .63 | .60 | .57 | .53 | .49 | .44 |
| 25 | —0.93 | .94 | .95 | .95 | .96 | .97 | .98 | .98 | 30 | 0.69 | .71 | .74 | .76 | .79 | .80 | .82 | .84 |
| Oct. 1 | +0.92 | 0.91 | 0.90 | 0.90 | 0.89 | 0.88 | 0.87 | 0.86 | 31 | —0.85 | 0.86 | 0.88 | 0.89 | 0.90 | 0.91 | 0.92 | 0.92 |

# TABLE III.

For finding the value of *N* for correcting lunar distances for the compression of the earth.

## TABLE III. *A.* giving 1st Part of *N.*

| App. Dist. | ☽'s Declination. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0° | 3° | 6° | 9° | 12° | 15° | 18° | 21° | 24° | 27° | 30° |
| 20° | −0″ | 3″ | 6″ | 10″ | 13″ | 16″ | 19″ | 22″ | 25″ | 28″ | 31″ |
| 22 | 0 | 3 | 6 | 9 | 12 | 14 | 17 | 20 | 23 | 25 | 28 |
| 24 | 0 | 3 | 5 | 8 | 11 | 13 | 16 | 18 | 21 | 23 | 25 |
| 26 | 0 | 2 | 5 | 7 | 10 | 12 | 14 | 17 | 19 | 21 | 23 |
| 28 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 |
| 30 | −0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 32 | 0 | 2 | 4 | 6 | 8 | 9 | 11 | 13 | 15 | 16 | 18 |
| 34 | 0 | 2 | 4 | 5 | 7 | 9 | 10 | 12 | 14 | 15 | 17 |
| 36 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 11 | 13 | 14 | 16 |
| 38 | 0 | 2 | 3 | 5 | 6 | 8 | 9 | 10 | 12 | 13 | 14 |
| 40 | −0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 13 |
| 42 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 13 |
| 44 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 |
| 46 | 0 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 48 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 50 | −0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 52 | 0 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 9 |
| 54 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 7 | 8 |
| 56 | 0 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 |
| 58 | 0 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 |
| 60 | −0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 |
| 62 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| 64 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 66 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 |
| 68 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 70 | −0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 |
| 72 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 74 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| 76 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 78 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 80 | −0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 82 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 84 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 88 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 90 | −0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 92 | +0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 96 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 98 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| 100 | +0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 102 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 104 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 106 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| 108 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 |
| 110 | +0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 |
| 112 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 114 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 |
| 116 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 118 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| 120 | +0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 |
| 122 | 0 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 |
| 124 | 0 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 |
| 126 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 7 | 8 |
| 128 | 0 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 9 |
| 130 | +0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## TABLE III. *B.* giving 2d Part of *N.*

| App. Dist. | ✱'s Declination. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0° | 3° | 6° | 9° | 12° | 15° | 18° | 21° | 24° | 27° | 30° |
| 20° | +0″ | 3″ | 7″ | 10″ | 14″ | 17″ | 20″ | 24″ | 27″ | 30″ | 33″ |
| 22 | 0 | 3 | 6 | 9 | 13 | 16 | 19 | 22 | 25 | 27 | 30 |
| 24 | 0 | 3 | 6 | 9 | 12 | 14 | 17 | 20 | 23 | 25 | 28 |
| 26 | 0 | 3 | 5 | 8 | 11 | 13 | 16 | 18 | 21 | 23 | 26 |
| 28 | 0 | 3 | 5 | 8 | 10 | 12 | 15 | 17 | 20 | 22 | 24 |
| 30 | +0 | 2 | 5 | 7 | 9 | 12 | 14 | 16 | 18 | 21 | 23 |
| 32 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 |
| 34 | 0 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 16 | 18 | 20 |
| 36 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 17 | 19 |
| 38 | 0 | 2 | 4 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 18 |
| 40 | +0 | 2 | 4 | 6 | 7 | 9 | 11 | 13 | 14 | 16 | 18 |
| 42 | 0 | 2 | 4 | 5 | 7 | 9 | 10 | 12 | 14 | 15 | 17 |
| 44 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 13 | 15 | 16 |
| 46 | 0 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 14 | 16 |
| 48 | 0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 15 |
| 50 | +0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 13 | 15 |
| 52 | 0 | 2 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 14 |
| 54 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 | 14 |
| 56 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 14 |
| 58 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 13 |
| 60 | +0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 13 |
| 62 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 12 | 13 |
| 64 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 13 |
| 66 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| 68 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| 70 | +0 | 1 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
| 72 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
| 74 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 |
| 76 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 |
| 78 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 |
| 80 | +0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 82 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 84 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 86 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 88 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 90 | +0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 92 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 94 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 96 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 98 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 100 | +0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 102 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 |
| 104 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 |
| 106 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 |
| 108 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
| 110 | +0 | 1 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 12 |
| 112 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| 114 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 |
| 116 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 13 |
| 118 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 12 | 13 |
| 120 | +0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 13 |
| 122 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 13 |
| 124 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 14 |
| 126 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 | 14 |
| 128 | 0 | 2 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 14 |
| 130 | +0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 13 | 15 |

The signs in the 0° column apply to all the numbers in the same line, and are to be used when the declination is *North.* When the declination is *South*, change the sign + to — and — to +.

# IMPROVED METHOD
# OF FINDING THE
# ERROR AND RATE OF A CHRONOMETER
# BY EQUAL ALTITUDES.

By W. CHAUVENET,
PROFESSOR OF MATHEMATICS IN THE UNITED STATES NAVAL ACADEMY.

# METHOD

OF FINDING THE

# ERROR AND RATE OF A CHRONOMETER BY EQUAL ALTITUDES.

To regulate a chronometer to Greenwich time, we must determine its error and rate at a place whose longitude is well known. The most accurate method of doing this is by observing the transit of the sun or a star over the meridian. For the navigator, the most simple and accurate substitute for the meridian observation is that of equal altitudes of the same object on each side of the meridian. In the case of a star, the mean of the two chronometer times corresponding to the equal altitudes is the chronometer time of transit; but in the case of the sun, the mean of these times differs somewhat from the time of transit, since, in consequence of the change of the sun's declination between the observations, the equal altitudes do not occur at equal intervals before and after the transit.

The small correction necessary, when the sun is observed, to reduce the mean of the times to the time of transit, is called the *Equation of Equal Altitudes.*

The method of computing this equation given below is based upon that first given by GAUSS (*Monatliche Correspondenz*, Vol. XXIII.). We do not, however, follow him in using the double daily change of declination, or difference between the sun's declination on the noon preceding and the noon following that of the observation; but prefer to use the hourly difference, because this may be obtained directly from the American Ephemeris, and is at the same time even more accurate. We also extend our table so as to meet the case where one altitude is taken in the afternoon and the corresponding equal altitude on the following morning; in which case, the equation is computed for apparent midnight.*

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* It should be observed, as a caution to navigators, that the rule for computing the equation for midnight is sometimes inaccurately, or incompletely, stated in works on navigation or astronomy. The rule in Lieut. RAPER'S *Practice of Navigation* is wholly erroneous. GALBRAITH'S rule (*Mathematical and Astronomical Tables*) is incomplete, in not noticing the case where the elapsed time is less than $12^{h.}$. His rule for computing the equation for noon is similarly defective, in not noticing the case where the elapsed time is greater than $12^{h.}$. In Professor INMAN'S rule there is a slight inaccuracy introduced, by taking the equation of time for mean, instead of apparent noon or midnight; and in all the books,

# EQUAL ALTITUDES.

## I. EQUAL ALTITUDES OF THE SUN, MORNING AND EVENING.

### The Observation.

On shore, at a place whose longitude is *accurately* known, and whose latitude is *approximately* known, observe with an artificial horizon the same altitude both in the morning and in the afternoon, as near the prime vertical as convenient after the altitude is more than 10°, noting the times by the chronometer. In low latitudes, however, the method of equal altitudes will often give very accurate results, even when the observations are quite near to the meridian. In general, a sufficiently accurate result may be obtained if the observations are taken when the sun's change of altitude is not less than 10″ in $0^m.5$, or when the change in the double altitude taken with the artificial horizon is not less than 20″ in $0^m.5$.

It is most convenient, as well as conducive to accuracy, to take the observation in the following manner. In the morning, bring the lower limb of the sun, reflected from the sextant-mirrors, and the upper limb of that reflected from the mercury, into approximate contact; move the 0 of the vernier forward (say from 10′ to 20′), and set it on a division of the limb; the images will be ***overlapped*** and will be ***separating***; wait for the instant of contact; note it by chronometer, and immediately set the vernier on the next division of the limb, that is, 10′ in advance; note the instant of contact again, and proceed in the same manner for as many observations as are thought necessary. If the sun rises too rapidly, let the intervals on the limb be 20′. Find (roughly) the time when the sun will be at the same altitude in the afternoon, and just before that time set the vernier on the last altitude noted in the morning (of course using the same sextant); the images of the sun will be ***separated***, but will be *approaching;* wait for the instant of contact; note it by chronometer; set the vernier *back* to the next division of the limb (10′ or 20′, as the case may be); note the contact again, and so proceed till all the A. M. altitudes have been again noted as P. M. altitudes.

### The Computation.

Take the mean of the A. M. times and call it the *A. M. Chronometer Time.* The mean of the P. M. times call the *P. M. Chronometer Time.* If, instead of noting the times by the chronometer, a watch is used (compared with the chronometer both before and after each observation), it will generally be found necessary to make an allowance for its gain or loss on the chronometer, so as to obtain the exact difference between the watch and chronometer at the instant of observation. This difference being applied to the mean of the watch times, we have the mean chronometer time the same as would have been found by employing the chronometer directly.

the methods given of taking out the sun's change of declination, whether for $48^h$ or for $24^h$, are not as accurate as they should be.

A perfectly accurate rule, with a special table, for the midnight correction, is given in Schumacher's *Hülfstafeln* (Ed. by Warnstorff). It requires, however, one logarithm more than our method in the text, and is otherwise not so simple.

# EQUAL ALTITUDES.

The half sum of the A. M. and P. M. Chronometer Times is the *Middle Chronometer Time*, their difference is the *Elapsed Time;* observing that when the A. M. time is before $12^{\text{h.}}$ by chronometer, while the P. M. time is after $12^{\text{h.}}$, the latter must be supposed to be increased by $12^{\text{h.}}$ in finding this half sum and difference.

Take from the Nautical Almanac the sun's declination, the hourly difference of declination, and the equation of time, reducing each to the instant of local apparent noon by applying the changes for the longitude.

Mark *north* latitude and *north* declination +
" *south* latitude and *south* declination —
" hourly diff. of decl. when *towards north* +
" hourly diff. of decl. when *towards south* —.

Enter Table I. with the elapsed time, and take out log. A and log. B, prefixing to each its proper sign given in the table at the head of the page.

To log. A add the log. of the hourly diff., Table II., and the log. tangent of the latitude (Bowditch, Table XXVII.). Prefix to each log. the sign of the quantity it represents and to their sum the sign which results from the algebraic combination of the three signs.[*] This sum is the log. (Table II.) of the number of seconds of time in the *first part* of equation of equal attitudes, to be marked + or — like its log.

To log. B. add the log. of the hourly diff. and the log. tangent of the declination, marking the signs as before. The sum is the log. of the *second part* of the equation of equal altitudes, to be marked + or — like its log.

Apply the two parts of the equation, according to their signs, to the Middle Chronometer Time; the result is the *Chronometer Time of Apparent Noon.*

To this apply the equation of time (adding, when the equation of time is additive to mean time, otherwise subtracting); the result is the *Chronometer Time of Mean Noon*, which, if the chronometer is regulated to local time, will be $12^{\text{h.}}\ 0^{\text{m.}}\ 0^{\text{s.}}$ when the chronometer is right; more than $12^{\text{h.}}$ when fast, less than $12^{\text{h.}}$ when slow.

If the chronometer is regulated to Greenwich time, apply the longitude (in time) to the chronometer time of mean noon (subtracting in west, adding in east); the result will be more or less than $12^{\text{h.}}$, according as the chronometer is fast or slow.

Repeat this process on a subsequent day. The difference between the chronometer errors on the two days, divided by the number of days in the interval, is the *daily rate* of the chronometer, *gaining* or *losing* according as the chronometer goes too fast or too slow.

### EXAMPLE 1.

May 3d, 1856. At the United States Naval Academy, Lat. 38° 59′ N., Long. $5^{\text{h.}}\ 5^{\text{m.}}\ 55^{\text{s.}}.1$ W., suppose the following observations of equal altitudes to be taken with an artificial horizon. Required the error of the chronometer on Greenwich time at noon of that day?

[*] The algebraic rule being, that, when there is an *odd* number of factors with the sign minus, the result must have the sign minus, otherwise the sign plus. In the present application of this rule, when there is either *one* or *three* of the logs. marked —, their sum must be marked —; otherwise +.

# EQUAL ALTITUDES.

A. M.
Comparisons.

| | h. | m. | s. |
|---|---|---|---|
| Chronom. | 12 | 52 | 0.0 |
| Watch | 7 | 45 | 8.0 |
| Diff. | 5 | 6 | 52.0 |
| Chronom. | 1 | 20 | 0.0 |
| Watch | 8 | 13 | 9.5 |
| Diff. | 5 | 6 | 50.5 |

Watch A. M.

| | h. | m. | s. |
|---|---|---|---|
| | 8 | 2 | 9. |
| | 8 | 2 | 35.5 |
| | 8 | 3 | 0.5 |
| Mean | 8 | 2 | 35.0 |
| Comparison | 5 | 6 | 51.1 |
| A. M. Chro. Time | 1 | 9 | 26.1 |
| P. M. Chro. Time | 8 | 58 | 11.7 |
| 2) | 10 | 7 | 37.8 |
| Middle Chro. T. | 5 | 3 | 48.9 |
| Equat. of Eq. Alts. | | | —8.8 |
| Chro. T. App. N. | 5 | 3 | 40.1 |
| Equat. of Time | | +3 | 19.4 |
| Chro. T. Mean N. | 5 | 6 | 59.5 |
| Longitude | 5 | 5 | 55.1 W. |
| Chro. *fast* | | 1 | 4.4 |

A. M., watch gains $1^{s.}.5$ in $28^{m.}$
Interval to obs. $17^{m.}.5$
$28^{m.} : 17^{m.}.5 = 1^{s.}.5 : 0^{s.}.9$

P. M., watch gains $2^{s.}.2$ in $34^{m.}$
Interval to obs. $21^{m.}$
$34^{m.} : 21^{m.} = 2^{s.}.2 : 1^{s.}.4$

2 ⊙ Art. Hor.

| ° | ′ |
|---|---|
| 65 | 50 |
| 66 | 0 |
| 66 | 10 |

| | m. | s. | s. |
|---|---|---|---|
| (Eq. T.) | —3 | 18.11 | 0.258 |
| | | 1.32 | 5.1 |
| Eq. T. | —3 | 19.43 | 1.32 |

| | ° | ′ | ″ | | ″ |
|---|---|---|---|---|---|
| (D.) | +15 | 48 | 50.5 | (H. D.) | +43.82 |
| | | 3 | 42.8 | | —0.14 |
| D. | +15 | 52 | 33.3 | H. D. | +43.68 |
| | | | | | 5.1 |
| | | | | | 222.8 |

P. M.
Comparisons.

| | h. | m. | s. |
|---|---|---|---|
| Chronom. | 8 | 37 | 0.0 |
| Watch | 3 | 30 | 31.3 |
| Diff. | 5 | 6 | 28.7 |
| Chronom. | 9 | 11 | 0.0 |
| Watch | 4 | 4 | 33.5 |
| Diff. | 5 | 6 | 26.5 |

Watch P. M.

| | h. | m. | s. |
|---|---|---|---|
| | 3 | 52 | 10.7 |
| | 3 | 51 | 44.0 |
| | 3 | 51 | 18.5 |
| Mean | 3 | 51 | 44.4 |
| Comparison | 5 | 6 | 27.3 |
| P. M. Chro. Time | 8 | 58 | 11.7 |
| A. M. Chro. Time | 1 | 9 | 26.1 |
| Elapsed Time | 7 | 48 | 45.6 |

Decrease in 24.0ʰ = 0.66″
Decrease in 5.1 = 0.14

| | | | |
|---|---|---|---|
| log. A. Tab. I. | —9.4846 | log. B. Tab. I. | +9.2011 |
| H. D. +43″.68 log. Tab. II. | +1.6403 | . . . . . . . . | +1.6403 |
| Lat. + 38° 59′ log. tan. | +9.9081 | D. + 15° 53′ log. tan. | +9.4542 |
| 1st Pt. Eq. $—10^{s.}.79$ log. | —1.0330 | 2d Pt. Eq. $+1^{s.}.98$ log. | +0.2956 |

By similar observations on May 15th, suppose the chronometer is found to be fast $12^{s.}.5$; we have

| | m. | s. |
|---|---|---|
| May 3d, fast | 1 | 4.4 |
| May 15th, fast | | 12.5 |
| Loses in 12 days | | 51.9 |
| Daily rate | | 4.33 losing. |

## II. EQUAL ALTITUDES OF THE SUN, EVENING AND MORNING.

### The Observation.

Take a set of altitudes, in the manner already explained, in the afternoon of one day, and the same altitudes in reverse order on the morning of the next, noting the times by the chronometer, or by a watch compared with it.

### The Computation.

The half sum of the P. M. and A. M. Chronometer Times is the *Middle Chronometer Time;* their difference is the *Elapsed Time;* observing that when the P. M. time is before $12^{h.}$ by chronometer, while the A. M. time is after $12^{h.}$, the latter must be supposed to be increased by $12^{h.}$ in finding this half sum and this difference.

Take from the Nautical Almanac the sun's declination, the hourly difference of declination, and the equation of time, reducing them each to the instant of local *apparent midnight.*

# EQUAL ALTITUDES.

Mark the sign of each quantity as before, and compute the two parts of the equation of equal altitudes precisely as in the preceding case, observing to mark the signs of log. A and log. B as given in the table for midnight.

Apply the two parts of the equation to the middle chronometer time, according to their signs; the result is the *Chronometer Time of Apparent Midnight.*

To this apply the equation of time (adding, when the equation of time is additive to mean time, otherwise subtracting); the result is the *Chronometer Time of Mean Midnight*, which, if the chronometer is regulated to local time, will be $12^{h.}\ 0^{m.}\ 0^{s.}$ when the chronometer is right; more than $12^{h.}$ when fast; less than $12^{h.}$ when slow.

If the chronometer is regulated to Greenwich time, apply the longitude, in time, to the chronometer time of mean midnight (subtracting in west, adding in east); the result will be more or less than $12^{h.}$ (or $24^{h.}$) according as the chronometer is fast or slow.

A repetition of this process at a subsequent day will give another error, whence the rate will be found as before. Or the rate may be found by comparing the results of an A. M. — P. M., and a P. M. — A. M. observation, remembering that the interval elapsed between two such observations is equal to the difference between the two dates *plus* or *minus* half a day.

### Example 2.

May 3d, 1856, Lat. 43° 21′ S., Long. $9^{h.}\ 50^{m.}\ 8^{s.}$ E., suppose the altitude of the sun to be observed in the afternoon and the same altitude again on the morning of the 4th, as below. Required the error of the chronometer on Greenwich time at midnight of the 3d?

| Chronom., P. M. | 2 ⊙Art. Hor. | Chronom., A. M. |
|---|---|---|
| $6^{h.}\ 54^{m.}\ 10^{s.}.3$ | 38° 0′ | $9^{h.}\ 9^{m.}\ 17^{s.}.5$ |

The A. M. time must be called $21^{h.}\ 9^{m.}\ 17^{s.}.5$. The Greenwich time of midnight, for which the declination, &c. must be found, is May $3^{d.}\ 2^{h.}\ 9^{m.}\ 52^{s.}$ (= $3^{d.}\ 2^{h.}.16$.).

| | h. | m. | s. | |
|---|---|---|---|---|
| P. M. Chro. T. | 6 | 54 | 10.3 | |
| A. M. Chro. T. | 21 | 9 | 17.5 | |
| 2) | 28 | 3 | 27.8 | |
| Middle Chro. T. | 14 | 1 | 43.9 | |
| Eq. of Eq. Alts. | | | —38.4 | |
| Chro.T.App.Midn. | 14 | 1 | 5.5 | |
| Eq. of Time | | +3 | 18.7 | |
| Chro.T.M'n Midn. | 14 | 4 | 24.2 | |
| Longitude | 9 | 50 | 8.0 | E. |
| | 23 | 54 | 32.2 | |
| | 24 | 0 | 0.0 | |
| Chronom. *slow* | | 5 | 27.8 | |

| | m. | s. | s. |
|---|---|---|---|
| (Eq. T.) | —3 | 18.11 | 0.258 |
| | | 0.56 | 2.15 |
| Eq. T. | —3 | 18.67 | 0.56 |

| | h. | m. | s. |
|---|---|---|---|
| A. M. Chro. T. | 21 | 9 | 17.5 |
| P. M. Chro. T. | 6 | 54 | 10.3 |
| Elapsed T. | 14 | 15 | 7.2 |

| | ° | ′ | ″ | | ″ |
|---|---|---|---|---|---|
| (D.) | +15 | 48 | 50.5 | (H. D.) | +43.82 |
| | | 1 | 34.1 | | —0.06 |
| D. | +15 | 50 | 24.6 | H. D | +43.76 |
| | | | | | 2.15 |
| | | | | | 94.1 |

| | h. | | ″ |
|---|---|---|---|
| Decrease in | 24.0 | = | 0.66 |
| Decrease in | 2.16 | = | 0.06 |

| | | | |
|---|---|---|---|
| | log.A.Tab.I. +9.6958 | | log. B. Tab. I. —9.1586 |
| H.D.+43″.76 | log. Tab. II. +1.6411 | . . . . . . . . | +1.6411 |
| Lat. —43° 21′ | log. tan. —9.9750 | D + 15° 50′ | log. tan. +9.4527 |
| 1st Pt. Eq. —20$^{s.}$.51 | log. —1.3119 | 2dPt.Eq.—17$^{s.}$.88 | log. —0.2524 |

By an A. M. — P. M. observation on May 20th, suppose this chronometer is found to be slow $8^{m.}\ 14^{s.}.6$; we have

| | d. | h. | | m. | s. | |
|---|---|---|---|---|---|---|
| May | 3 | 12 | slow | 5 | 27.8 | |
| May | 20 | 0 | slow | 8 | 14.6 | |
| Loses in 16$^{d.}$.5 | | | . | 2 | 46.8 | |
| Daily rate | | | | | 10.11 | losing. |

## III. EQUAL ALTITUDES OF A FIXED STAR.

### The Observation.

In selecting stars for this observation, it is to be observed that the nearer the zenith the star passes, the less may the elapsed time be; and when the star passes exactly through the zenith, the two altitudes may be taken within a few minutes of each other. But with the ordinary sextants, altitudes near 90° cannot be taken with the artificial horizon, as the double altitude is then nearly 180°. The prismatic sextants, or still better, the prismatic circles of Pistor and Martin, are adapted for measuring angles of all magnitudes up to 180°, and are therefore especially suitable for this observation.

Set the sextant and wait for the coincidences of the two images of the star, as in the case of the sun's limb, noting the times by chronometer or watch.

### The Computation.

Take the mean of the times before the meridian passage as the *A. M. Chronometer Time*, and the mean of those after the meridian passage as the *P. M. Chronometer Time.*

The mean of the A. M. and P. M. Chronometer Times is the *Chronometer Time of Star's Transit.* This time, if the chronometer is right, will agree with the true mean time of star's transit, which is to be computed as follows.

To the right ascension of the star apply the longitude of the place of observation (adding in west, subtracting in east); the result is the *Greenwich Sidereal Time of Star's Transit*, from which subtract the sidereal time at the *preceding* mean noon Greenwich (Nautical Almanac, page II. of the month); the remainder is the *Sidereal Interval* since mean noon. From Table IV. with the argument *Sidereal Interval*, take out the correction, which subtract from the sidereal interval; the remainder is the Greenwich Mean Time of the Star's Transit. The chronometer time will be more or less than this according as the chronometer is fast or slow.

If the chronometer is regulated to local time, apply the longitude to the Greenwich mean time of star's transit (subtracting in west, adding in east); the result is the *Local Mean Time of Star's Transit*, and the chronometer is fast or slow according as it shows more or less than this time.

### Example 3.

July 15th, 1856, at the Cape of Good Hope, Lat. 33° 56′ S., Long. $1^{h.}\ 13^{m.}\ 56^{s.}$ E., observed equal altitudes of *Antares* as follows: —

| | Chronom. A. M. | 2 Alt. Antares. | | Chronom. P. M |
|---|---|---|---|---|
| | h. m. s. | ° ′ | | h. m. s. |
| | 5 32 10.5 | 125 30 | | 9 34 20.3 |
| | 5 32 35.0 | 40 | | 9 33 56.0 |
| | 5 32 59.3 | 50 | | 9 33 32.0 |
| A. M. Chro. T. | 5 32 34.9 | | P. M. Chro. T. | 9 33 56.1 |
| P. M. Chro. T. | 9 33 56.1 | | | |
| | 2)15 6 31.0 | | | |
| Chro. T. ✱ Transit | 7 33 15.5 | | | |
| Gr. T. ✱ Transit | 7 31 22.1 | | | |
| Chro. fast | 1 53.4 | | | |

| | h. m. s. |
|---|---|
| Antares R. A. | 16 20 37.58 |
| Longitude | 1 13 56.00 E. |
| Gr. Sid. T. | 15 6 41.58 |
| July 15, Gr. Sid. T. Mean Noon | 7 34 5.25 |
| Sid. Interval | 7 32 36.33 |
| Correction, Table IV. | —1 14.15 |
| Gr. M. T. ✱ Transit | 7 31 22.18 |

## IV. TO CORRECT FOR SMALL INEQUALITIES IN THE ALTITUDES.

Although the sextant readings are the same at the A. M. and P. M. observations, it may happen that neither the true nor even the apparent altitudes are the same. 1st. Supposing the sextant to remain unchanged, the atmospheric refraction may be different at the two observations in consequence of changes in the density and temperature of the air as shown by the barometer and thermometer. In this case, the apparent altitudes are equal, but the true altitudes are not so. 2d. The sextant may be affected by changes of temperature, particularly in day observations in the sun, so as to make the sextant readings the same for apparent altitudes slightly different. I do not think these changes in the sextant are to be eliminated by determining the index error at each observation, as has been supposed by some, since it is quite possible that the expansion and contraction of the various parts might leave the index correction unchanged while it affected the readings of the altitudes, or the reverse. The only course appears to be to guard the instrument as much as possible from changes of temperature, exposing it to the sun's rays only during the few minutes required for each observation.

But the correction for changes of refraction may be satisfactorily made as follows. Note the barometer and thermometer both A. M. and P. M.; take out the corresponding refractions for each observation from Tables III., III. A., and III. B., and find the difference of these refractions. Also take the difference between any two sextant readings and the difference between the two corresponding chronometer times. Then the correction of either noon or midnight will be found by the following proportion. The difference of the sextant readings is to the difference of the refractions as the difference of the chronometer times is to the required correction.

Apply this correction to the Chronometer Time of Noon or Midnight (obtained by the preceding rules) as follows: *add* it when the A. M. refraction is the greater; *subtract* it when the P. M. refraction is the greater. The result is the true Chronometer Time of Noon or Midnight.

Example. — Suppose, in Example 1, we have in the morning, Barometer 30 inches, Thermometer 55°; in the afternoon, Barometer 29.5 inches, Thermometer 85°. The apparent altitude of sun's lower limb 33° 0′; the apparent altitude of sun's centre 33° 16′. We have

# EQUAL ALTITUDES.

| A. M. | ′ ″ |
|---|---|
| Mean refraction | 1 29 |
| Barom. 30 in. | 0 |
| Therm. 55° | —1 |
| True refraction | 1 28 |

| P. M. | ′ ″ |
|---|---|
| Mean refraction | 1 29 |
| Barom. 29.5 in. | —1 |
| Therm. 85° | —6 |
| True refraction | 1 22 |

Then the difference of the sextant readings is 10′ (=600″) and the corresponding diff. of chronometer times is about 26ˢ ; whence

$$600'' : 6'' = 26^{s} : 0^{s}.26$$

| | h. m. s. |
|---|---|
| The (approximate) Chronometer Time of Mean Noon was found to be | 5 6 59.5 |
| Correction for change of refraction | +0.3 |
| True Chronometer Time of Mean Noon | 5 6 59.8 |

Note. — This correction may be found by the following rule, which we should have to resort to when but one altitude was taken at each observation. Add together the log. of the diff. of refractions (Tab. II.), log. cosine of the altitude, log. secant of the latitude, log. secant of the declination, log. cosecant of half elapsed time (or if the elapsed time is greater than 12ʰ·, half its supplement to 24ʰ·), and the constant log. 8.523; the sum is the log. (Table II.) of the required correction. Thus in the preceding example we have

| | | | |
|---|---|---|---|
| Diff. refr. | 6″ | log. | 0.778 |
| Alt. ⊙ | 33° 16′ | log. cos. | 9.922 |
| Lat. | 38° 59′ | log. sec. | 0.109 |
| Dec. | 15° 53′ | log. sec. | 0.017 |
| El. T. | 7ʰ· 49ᵐ· | log. cosec.* | 0.069 |
| | | const. log. | 8.523 |
| Correction | 0ˢ·.26 | log. | 9.418 |

### Degree of Dependence.

An error of 5′ in the latitude would not affect the corresponding part of the equation of equal altitudes by more than one hundredth of its amount in the most unfavorable case, and in general would have no sensible effect. It is one of the advantages of the equal altitude method, therefore, that it does not require an accurate knowledge of the latitude. It is also plain that errors in the longitude affecting the declination and its hourly difference produce but small proportionate effects upon the computed equation. The absolute error of the chronometer on Greenwich will be affected by the whole error in the longitude, but the *rate* will still be correct. Hence we conclude that by this method the chronometer may be accurately *rated* at a place whose latitude and longitude are both imperfectly known.

The chief source of error is in the observation itself. The most practised observers with the sextant cannot depend on the noted time of a *single* contact within 0ˢ·.5, and hence the intervals between the successive chronometer times (which, if observations could be perfectly taken would be sensibly equal) may differ 2ˢ·. But the greatest probable error of the chronometer time of sun's or star's transit, from the mean of six such observations on each side of the meridian, is found to be not more than 0ˢ·.2, provided the rate of the chronometer between the observations is uniform.

Errors resulting from changes in the refraction may be almost wholly removed by computation as above.

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* Enter Bowditch's Table XXVII., column P. M., with the *whole* elapsed time and take out the corresponding cosecant.

# EXPLANATION OF THE TABLES.

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**Table I.** — *Logarithms of A and B, for computing the Equation of Equal Altitudes*, are calculated by the formulas

$$A = \frac{E}{1800 \sin \frac{1}{2} E}, \quad B = \frac{E}{1800 \tan \frac{1}{2} E},$$

where $E$ = elapsed time in minutes, and $E$ in the denominator is the elapsed time expressed in arc.

If we put

$\phi$ = latitude of the place of observation, + north, — south,
$\delta$ = declination of the sun, + north, — south,
$\Delta$ = hourly change of declination, + north, — south,
$\chi$ = correction to reduce the middle chronometer time to chronometer time of apparent noon, algebraically additive,
$\chi'$ = the same for midnight,

we have

$$\chi = -A \, \Delta \tan \phi + B \, \Delta \tan \delta$$
$$\chi' = A \, \Delta \tan \phi + B \, \Delta \tan \delta.$$

**Table II.** — *Logarithms of Numbers* to four decimal places. The first two figures of the number are found in the left-hand column, the third at the top, and the corresponding logarithm opposite and under these respectively. The proportional part for the fourth figure is found on the side in the same line with the logarithm taken out. The proper characteristic of the logarithm is to be supplied by the usual rule.

**Table III.** — *Mean Refraction*, reduced from Bessel's Tables, to barometer 30 inches, and thermometer 50°.

**Tables III. A. and III. B.** — *Corrections of the Mean Refraction for the Height of the Barometer and Thermometer*, also deduced from Bessel's Tables. These are the same as Tables IV. A. and IV. B., given in the Appendix to the Nautical Almanac for 1855, where they are used for finding the corrections of the *Mean Reduced Refraction for Lunars*. It is for the purpose of having the same table for correcting both these mean refraction tables, that the argument in Tables III. A. and III. B. is the mean refraction instead of the apparent altitude.

**Table IV.** — *For converting Sidereal into Mean Solar Time.* This table gives the correction required to reduce a sidereal interval to its equivalent solar interval.

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A —
For Midnight, A +

ARGUMENT = ELAPSED TIME.

For Noon or Midnight, B +

| Elapsed Time. | $0^{h.}$ | | $1^{h.}$ | | $2^{h.}$ | | $3^{h.}$ | | $4^{h.}$ | | $5^{h.}$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. |
| m | | | | | | | | | | | | |
| 0 | 9.4059 | 9.4059 | 9.4072 | 9.4034 | 9.4109 | 9.3959 | 9.4172 | 9.3828 | 9.4260 | 9.3635 | 9.4374 | 9.3369 |
| 1 | .4059 | .4059 | .4072 | .4034 | .4110 | .3957 | .4173 | .3825 | .4261 | .3631 | .4376 | .3364 |
| 2 | .4059 | .4059 | .4073 | .4033 | .4111 | .3955 | .4174 | .3822 | .4263 | .3627 | .4378 | .3358 |
| 3 | .4059 | .4059 | .4073 | .4032 | .4112 | .3953 | .4175 | .3820 | .4265 | .3624 | .4380 | .3353 |
| 4 | .4059 | .4059 | .4074 | .4031 | .4113 | .3952 | .4177 | .3817 | .4266 | .3620 | .4383 | .3348 |
| 5 | 9.4059 | 9.4059 | 9.4074 | 9.4030 | 9.4113 | 9.3950 | 9.4178 | 9.3814 | 9.4268 | 9.3616 | 9.4385 | 9.3343 |
| 6 | .4060 | .4059 | .4074 | .4029 | .4114 | .3948 | .4179 | .3811 | .4270 | .3612 | .4387 | .3337 |
| 7 | .4060 | .4059 | .4075 | .4028 | .4115 | .3946 | .4181 | .3809 | .4272 | .3608 | .4389 | .3332 |
| 8 | .4060 | .4059 | .4075 | .4027 | .4116 | .3944 | .4182 | .3806 | .4273 | .3604 | .4391 | .3327 |
| 9 | .4060 | .4059 | .4076 | .4026 | .4117 | .3943 | .4183 | .3803 | .4275 | .3600 | .4393 | .3321 |
| 10 | 9.4060 | 9.4059 | 9.4076 | 9.4025 | 9.4118 | 9.3941 | 9.4184 | 9.3800 | 9.4277 | 9.3596 | 9.4396 | 9.3316 |
| 11 | .4060 | .4059 | .4077 | .4024 | .4119 | .3939 | .4186 | .3797 | .4279 | .3592 | .4398 | .3311 |
| 12 | .4060 | .4058 | .4077 | .4023 | .4120 | .3937 | .4187 | .3794 | .4280 | .3588 | .4400 | .3305 |
| 13 | .4060 | .4058 | .4078 | .4022 | .4121 | .3935 | .4188 | .3792 | .4282 | .3584 | .4402 | .3300 |
| 14 | .4060 | .4058 | .4078 | .4021 | .4121 | .3933 | .4190 | .3789 | .4284 | .3580 | .4405 | .3294 |
| 15 | 9.4060 | 9.4058 | 9.4079 | 9.4020 | 9.4122 | 9.3931 | 9.4191 | 9.3786 | 9.4286 | 9.3576 | 9.4407 | 9.3289 |
| 16 | .4060 | .4058 | .4079 | .4019 | .4123 | .3929 | .4193 | .3783 | .4288 | .3572 | .4409 | .3283 |
| 17 | .4060 | .4057 | .4080 | .4018 | .4124 | .3927 | .4194 | .3780 | .4289 | .3568 | .4411 | .3278 |
| 18 | .4061 | .4057 | .4080 | .4017 | .4125 | .3925 | .4195 | .3777 | .4291 | .3564 | .4414 | .3272 |
| 19 | .4061 | .4057 | .4081 | .4016 | .4126 | .3923 | .4197 | .3774 | .4293 | .3559 | .4416 | .3266 |
| 20 | 9.4061 | 9.4057 | 9.4081 | 9.4015 | 9.4127 | 9.3921 | 9.4198 | 9.3771 | 9.4295 | 9.3555 | 9.4418 | 9.3261 |
| 21 | .4061 | .4056 | .4082 | .4014 | .4128 | .3919 | .4199 | .3768 | .4297 | .3551 | .4420 | .3255 |
| 22 | .4061 | .4056 | .4083 | .4013 | .4129 | .3917 | .4201 | .3765 | .4299 | .3547 | .4423 | .3249 |
| 23 | .4061 | .4056 | .4083 | .4012 | .4130 | .3915 | .4202 | .3762 | .4300 | .3542 | .4425 | .3244 |
| 24 | .4061 | .4055 | .4084 | .4010 | .4131 | .3913 | .4204 | .3759 | .4302 | .3538 | .4427 | .3238 |
| 25 | 9.4062 | 9.4055 | 9.4084 | 9.4009 | 9.4132 | 9.3911 | 9.4205 | 9.3756 | 9.4304 | 9.3534 | 9.4430 | 9.3232 |
| 26 | .4062 | .4055 | .4085 | .4008 | .4133 | .3909 | .4207 | .3752 | .4306 | .3530 | .4432 | .3226 |
| 27 | .4062 | .4054 | .4086 | .4007 | .4134 | .3907 | .4208 | .3749 | .4308 | .3525 | .4434 | .3220 |
| 28 | .4062 | .4054 | .4086 | .4006 | .4135 | .3905 | .4209 | .3746 | .4310 | .3521 | .4437 | .3214 |
| 29 | .4062 | .4054 | .4087 | .4004 | .4136 | .3903 | .4211 | .3743 | .4312 | .3516 | .4439 | .3208 |
| 30 | 9.4062 | 9.4053 | 9.4087 | 9.4003 | 9.4137 | 9.3900 | 9.4212 | 9.3740 | 9.4314 | 9.3512 | 9.4441 | 9.3203 |
| 31 | .4063 | .4053 | .4088 | .4002 | .4138 | .3898 | .4214 | .3737 | .4315 | .3508 | .4444 | .3197 |
| 32 | .4063 | .4052 | .4089 | .4001 | .4139 | .3896 | .4215 | .3733 | .4317 | .3503 | .4446 | .3191 |
| 33 | .4063 | .4052 | .4089 | .3999 | .4140 | .3894 | .4217 | .3730 | .4319 | .3499 | .4448 | .3185 |
| 34 | .4063 | .4051 | .4090 | .3998 | .4141 | .3892 | .4218 | .3727 | .4321 | .3494 | .4451 | .3178 |
| 35 | 9.4064 | 9.4051 | 9.4091 | 9.3997 | 9.4142 | 9.3889 | 9.4220 | 9.3723 | 9.4323 | 9.3490 | 9.4453 | 9.3172 |
| 36 | .4064 | .4050 | .4091 | .3995 | .4144 | .3887 | .4221 | .3720 | .4325 | .3485 | .4456 | .3166 |
| 37 | .4064 | .4050 | .4092 | .3994 | .4145 | .3885 | .4223 | .3717 | .4327 | .3480 | .4458 | .3160 |
| 38 | .4064 | .4049 | .4093 | .3993 | .4146 | .3882 | .4224 | .3713 | .4329 | .3476 | .4460 | .3154 |
| 39 | .4065 | .4049 | .4093 | .3991 | .4147 | .3880 | .4226 | .3710 | .4331 | .3471 | .4463 | .3148 |
| 40 | 9.4065 | 9.4048 | 9.4094 | 9.3990 | 9.4148 | 9.3878 | 9.4227 | 9.3707 | 9.4333 | 9.3467 | 9.4465 | 9.3142 |
| 41 | .4065 | .4048 | .4095 | .3988 | .4149 | .3875 | .4229 | .3703 | .4335 | .3462 | .4468 | .3135 |
| 42 | .4065 | .4047 | .4095 | .3987 | .4150 | .3873 | .4231 | .3700 | .4337 | .3457 | .4470 | .3129 |
| 43 | .4066 | .4047 | .4096 | .3985 | .4151 | .3871 | .4232 | .3696 | .4339 | .3453 | .4473 | .3123 |
| 44 | .4066 | .4046 | .4097 | .3984 | .4152 | .3868 | .4234 | .3693 | .4341 | .3448 | .4475 | .3116 |
| 45 | 9.4066 | 9.4045 | 9.4097 | 9.3982 | 9.4154 | 9.3866 | 9.4235 | 9.3690 | 9.4343 | 9.3443 | 9.4477 | 9.3110 |
| 46 | .4067 | .4045 | .4098 | .3981 | .4155 | .3863 | .4237 | .3686 | .4345 | .3438 | .4480 | .3103 |
| 47 | .4067 | .4044 | .4099 | .3979 | .4156 | .3861 | .4238 | .3683 | .4347 | .3433 | .4482 | .3097 |
| 48 | .4067 | .4043 | .4100 | .3978 | .4157 | .3859 | .4240 | .3679 | .4349 | .3429 | .4485 | .3091 |
| 49 | .4068 | .4043 | .4100 | .3976 | .4158 | .3856 | .4242 | .3675 | .4351 | .3424 | .4487 | .3084 |
| 50 | 9.4068 | 9.4042 | 9.4101 | 9.3975 | 9.4159 | 9.3854 | 9.4243 | 9.3672 | 9.4353 | 9.3419 | 9.4490 | 9.3078 |
| 51 | .4068 | .4041 | .4102 | .3973 | .4161 | .3851 | .4245 | .3668 | .4355 | .3414 | .4492 | .3071 |
| 52 | .4069 | .4041 | .4103 | .3972 | .4162 | .3849 | .4246 | .3665 | .4357 | .3409 | .4494 | .3064 |
| 53 | .4069 | .4040 | .4103 | .3970 | .4163 | .3846 | .4248 | .3661 | .4359 | .3404 | .4497 | .3058 |
| 54 | .4069 | .4039 | .4104 | .3969 | .4164 | .3843 | .4250 | .3657 | .4361 | .3399 | .4500 | .3051 |
| 55 | 9.4070 | 9.4038 | 9.4105 | 9.3967 | 9.4165 | 9.3841 | 9.4251 | 9.3654 | 9.4363 | 9.3394 | 9.4503 | 9.3044 |
| 56 | .4070 | .4038 | .4106 | .3965 | .4167 | .3838 | .4253 | .3650 | .4366 | .3389 | .4505 | .3038 |
| 57 | .4071 | .4037 | .4107 | .3964 | .4168 | .3836 | .4255 | .3646 | .4368 | .3384 | .4508 | .3031 |
| 58 | .4071 | .4036 | .4107 | .3962 | .4169 | .3833 | .4256 | .3643 | .4370 | .3379 | .4510 | .3024 |
| 59 | .4071 | .4035 | .4108 | .3960 | .4170 | .3830 | .4258 | .3639 | .4372 | .3374 | .4513 | .3017 |
| 60 | 9.4072 | 9 4034 | 9.4109 | 9.3959 | 9.4172 | 9.3828 | 9.4260 | 9.3635 | 9.4374 | 9.3369 | 9.4515 | 9.3010 |

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — }
For Midnight, A + }

ARGUMENT = ELAPSED TIME.

{ For Noon or
{ Midnight, B +

| Elapsed Time. | 6h. | | 7h. | | 8h. | | 9h. | | 10h. | | 11h. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| m | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. |
| 0 | 9.4515 | 9.3010 | 9.4685 | 9.2530 | 9.4884 | 9.1874 | 9.5115 | 9.0943 | 9.5379 | 8.9509 | 9.5680 | 8.6837 |
| 1 | .4518 | .3003 | .4688 | .2520 | .4888 | .1861 | .5119 | .0925 | .5384 | .9478 | .5685 | .6770 |
| 2 | .4521 | .2996 | .4691 | .2511 | .4892 | .1848 | .5123 | .0906 | .5389 | .9447 | .5691 | .6701 |
| 3 | .4523 | .2989 | .4694 | .2502 | .4895 | .1835 | .5127 | .0887 | .5393 | .9416 | .5696 | .6632 |
| 4 | .4526 | .2982 | .4697 | .2492 | .4899 | .1822 | .5132 | .0867 | .5398 | .9384 | .5701 | .6560 |
| 5 | 9.4528 | 9.2975 | 9.4701 | 9.2483 | 9.4902 | 9.1809 | 9.5136 | 9.0848 | 9.5403 | 8.9352 | 9.5707 | 8.6488 |
| 6 | .4531 | .2968 | .4704 | .2473 | .4906 | .1796 | .5140 | .0828 | .5408 | .9320 | .5712 | .6414 |
| 7 | .4534 | .2961 | .4707 | .2463 | .4910 | .1782 | .5144 | .0809 | .5412 | .9287 | .5718 | .6339 |
| 8 | .4536 | .2954 | .4710 | .2454 | .4913 | .1769 | .5148 | .0789 | .5417 | .9254 | .5723 | .6262 |
| 9 | .4539 | .2947 | .4713 | .2444 | .4917 | .1756 | .5153 | .0769 | .5422 | .9221 | .5728 | .6183 |
| 10 | 9.4542 | 9.2940 | 9.4716 | 9.2434 | 9.4921 | 9.1742 | 9.5157 | 9.0749 | 9.5427 | 8.9187 | 9.5734 | 8.6103 |
| 11 | .4544 | .2932 | .4719 | .2425 | .4924 | .1728 | .5161 | .0729 | .5432 | .9153 | .5739 | .6021 |
| 12 | .4547 | .2925 | .4723 | .2415 | .4928 | .1715 | .5165 | .0708 | .5436 | .9118 | .5745 | .5937 |
| 13 | .4550 | .2918 | .4726 | .2405 | .4932 | .1701 | .5169 | .0688 | .5441 | .9083 | .5750 | .5852 |
| 14 | .4552 | .2911 | .4729 | .2395 | .4935 | .1687 | .5174 | .0667 | .5446 | .9048 | .5756 | .5764 |
| 15 | 9.4555 | 9.2903 | 9.4732 | 9.2385 | 9.4939 | 9.1673 | 9.5178 | 9.0646 | 9.5451 | 8.9013 | 9.5761 | 8.5674 |
| 16 | .4558 | .2896 | .4735 | .2375 | .4943 | .1659 | .5182 | .0625 | .5456 | .8977 | .5767 | .5583 |
| 17 | .4561 | .2888 | .4738 | .2365 | .4946 | .1645 | .5186 | .0604 | .5461 | .8940 | .5772 | .5488 |
| 18 | .4563 | .2881 | .4742 | .2355 | .4950 | .1630 | .5191 | .0583 | .5466 | .8903 | .5778 | .5392 |
| 19 | .4566 | .2873 | .4745 | .2344 | .4954 | .1616 | .5195 | .0561 | .5470 | .8866 | .5783 | .5293 |
| 20 | 9.4569 | 9.2866 | 9.4748 | 9.2334 | 9.4958 | 9.1602 | 9.5199 | 9.0540 | 9.5475 | 8.8829 | 9.5789 | 8.5192 |
| 21 | .4572 | .2858 | .4751 | .2324 | .4961 | .1587 | .5204 | .0518 | .5480 | .8791 | .5794 | .5088 |
| 22 | .4574 | .2850 | .4755 | .2313 | .4965 | .1573 | .5208 | .0496 | .5485 | .8752 | .5800 | .4981 |
| 23 | .4577 | .2843 | .4758 | .2303 | .4969 | .1558 | .5212 | .0474 | .5490 | .8713 | .5806 | .4871 |
| 24 | .4580 | .2835 | .4761 | .2292 | .4973 | .1543 | .5217 | .0452 | .5495 | .8674 | .5811 | .4758 |
| 25 | 9.4583 | 9.2827 | 9.4764 | 9.2282 | 9.4977 | 9.1528 | 9.5221 | 9.0429 | 9.5500 | 8.8634 | 9.5817 | 8.4641 |
| 26 | .4585 | .2819 | .4768 | .2271 | .4980 | .1513 | .5225 | .0406 | .5505 | .8594 | .5822 | .4521 |
| 27 | .4588 | .2812 | .4771 | .2261 | .4984 | .1498 | .5230 | .0383 | .5510 | .8553 | .5828 | .4397 |
| 28 | .4591 | .2804 | .4774 | .2250 | .4988 | .1483 | .5234 | .0360 | .5515 | .8512 | .5834 | .4270 |
| 29 | .4594 | .2796 | .4778 | .2239 | .4992 | .1468 | .5238 | .0337 | .5520 | .8470 | .5839 | .4138 |
| 30 | 9.4597 | 9.2788 | 9.4781 | 9.2228 | 9.4996 | 9.1453 | 9.5243 | 9.0314 | 9.5525 | 8.8427 | 9.5845 | 8.4001 |
| 31 | .4600 | .2780 | .4784 | .2217 | .5000 | .1437 | .5247 | .0290 | .5580 | .8384 | .5851 | .3860 |
| 32 | .4602 | .2772 | .4788 | .2206 | .5003 | .1422 | .5252 | .0266 | .5585 | .8341 | .5856 | .3718 |
| 33 | .4605 | .2764 | .4791 | .2195 | .5007 | .1406 | .5256 | .0242 | .5540 | .8297 | .5862 | .3561 |
| 34 | .4608 | .2756 | .4794 | .2184 | .5011 | .1390 | .5261 | .0218 | .5545 | .8253 | .5868 | .3403 |
| 35 | 9.4611 | 9.2747 | 9.4798 | 9.2173 | 9.5015 | 9.1375 | 9.5265 | 9.0194 | 9.5550 | 8.8208 | 9.5874 | 8.3239 |
| 36 | .4614 | .2739 | .4801 | .2162 | .5019 | .1359 | .5269 | .0169 | .5555 | .8162 | .5879 | .3067 |
| 37 | .4617 | .2731 | .4804 | .2151 | .5023 | .1343 | .5274 | .0144 | .5560 | .8115 | .5885 | .2888 |
| 38 | .4620 | .2723 | .4808 | .2140 | .5027 | .1827 | .5278 | .0119 | .5565 | .8068 | .5891 | .2701 |
| 39 | .4622 | .2714 | .4811 | .2128 | .5031 | .1310 | .5283 | .0094 | .5570 | .8020 | .5897 | .2505 |
| 40 | 9.4625 | 9.2706 | 9.4815 | 9.2117 | 9.5035 | 9.1294 | 9.5287 | 9.0069 | 9.5576 | 8.7972 | 9.5902 | 8.2299 |
| 41 | .4628 | .2698 | .4818 | .2105 | .5038 | .1278 | .5292 | .0043 | .5581 | .7923 | .5908 | .2082 |
| 42 | .4631 | .2689 | .4821 | .2094 | .5042 | .1261 | .5296 | .0017 | .5586 | .7873 | .5914 | .1853 |
| 43 | .4634 | .2681 | .4825 | .2082 | .5046 | .1244 | .5301 | 8.9991 | .5591 | .7823 | .5920 | .1611 |
| 44 | .4637 | .2672 | .4828 | .2070 | .5050 | .1228 | .5305 | .9965 | .5596 | .7772 | .5926 | .1354 |
| 45 | 9.4640 | 9.2664 | 9.4832 | 9.2059 | 9.5054 | 9.1211 | 9.5310 | 8.9938 | 9.5601 | 8.7720 | 9.5931 | 8.1080 |
| 46 | .4643 | .2655 | .4835 | .2047 | .5058 | .1194 | .5315 | .9911 | .5606 | .7668 | .5937 | .0786 |
| 47 | .4646 | .2646 | .4839 | .2035 | .5062 | .1177 | .5319 | .9884 | .5612 | .7614 | .5943 | .0470 |
| 48 | .4649 | .2638 | .4842 | .2023 | .5066 | .1159 | .5324 | .9857 | .5617 | .7560 | .5949 | .0128 |
| 49 | .4652 | .2629 | .4846 | .2011 | .5070 | .1142 | .5328 | .9830 | .5622 | .7505 | .5955 | 7.9756 |
| 50 | 9.4655 | 9.2620 | 9.4849 | 9.1999 | 9.5074 | 9.1125 | 9.5333 | 8.9802 | 9.5627 | 8.7449 | 9.5961 | 7.9348 |
| 51 | .4658 | .2611 | .4853 | .1987 | .5078 | .1107 | .5337 | .9774 | .5632 | .7392 | .5967 | .8897 |
| 52 | .4661 | .2602 | .4856 | .1974 | .5082 | .1089 | .5342 | .9745 | .5638 | .7335 | .5978 | .8391 |
| 53 | .4664 | .2593 | .4860 | .1962 | .5086 | .1072 | .5347 | .9717 | .5643 | .7276 | .5979 | .7817 |
| 54 | .4667 | .2584 | .4863 | .1950 | .5091 | .1054 | .5351 | .9688 | .5648 | .7217 | .5985 | .7154 |
| 55 | 9.4670 | 9.2575 | 9.4867 | 9.1937 | 9.5095 | 9.1036 | 9.5356 | 8.9659 | 9.5654 | 8.7156 | 9.5991 | 7.6368 |
| 56 | .4673 | .2566 | .4870 | .1925 | .5099 | .1017 | .5361 | .9630 | .5659 | .7094 | .5997 | .5405 |
| 57 | .4676 | .2557 | .4874 | .1912 | .5103 | .0999 | .5365 | .9600 | .5664 | .7032 | .6003 | .4162 |
| 58 | .4679 | .2548 | .4877 | .1900 | .5107 | .0981 | .5370 | .9570 | .5669 | .6968 | .6009 | .2407 |
| 59 | .4682 | .2539 | .4881 | .1887 | .5111 | .0962 | .5375 | .9540 | .5675 | .6903 | .6015 | 6.9591 |
| 60 | 9.4685 | 9 2530 | 9.4884 | 9.1874 | 9.5115 | 9.0943 | 9.5379 | 8.9509 | 9.5680 | 8.6837 | 9.6021 | *Inf.* |

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — }
For Midnight, A + }

ARGUMENT = ELAPSED TIME.

{ For Noon or Midnight, B —

| Elapsed Time. | $12^{\text{h}}$ | | $13^{\text{h}}$ | | $14^{\text{h}}$ | | $15^{\text{h}}$ | | $16^{\text{h}}$ | | $17^{\text{h}}$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| m | Log. A. | Log. B. | Log. A. | Log. B | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. |
| 0 | 9.6021 | *Inf.* | 9.6406 | 8.7563 | 9.6841 | 9.0971 | 9.7833 | 9.3162 | 9.7895 | 9.4884 | 9.8539 | 9.6383 |
| 1 | .6027 | 6.9603 | .6412 | .7641 | .6848 | .1014 | .7342 | .3194 | .7905 | .4911 | .8550 | .6407 |
| 2 | .6033 | 7.2431 | .6419 | .7718 | .6856 | .1057 | .7351 | .3225 | .7915 | .4937 | .8562 | .6431 |
| 3 | .6039 | .4198 | .6426 | .7794 | .6864 | .1099 | .7360 | .3256 | .7925 | .4963 | .8573 | .6455 |
| 4 | .6045 | .5453 | .6433 | .7868 | .6872 | .1141 | .7369 | .3287 | .7935 | .4990 | .8585 | .6478 |
| 5 | 9.6051 | 7.6428 | 9.6440 | 8.7942 | 9.6879 | 9.1183 | 9.7378 | 9.3319 | 9.7945 | 9.5016 | 9.8597 | 9.6502 |
| 6 | .6057 | .7226 | .6447 | .8015 | .6887 | .1224 | .7386 | .3350 | .7955 | .5042 | .8608 | .6526 |
| 7 | .6063 | .7902 | .6454 | .8087 | .6895 | .1265 | .7395 | .3380 | .7965 | .5068 | .8620 | .6550 |
| 8 | .6069 | .8488 | .6461 | .8158 | .6903 | .1306 | .7404 | .3411 | .7975 | .5094 | .8632 | .6573 |
| 9 | .6075 | .9005 | .6467 | .8227 | .6911 | .1347 | .7413 | .3442 | .7986 | .5120 | .8644 | .6597 |
| 10 | 9.6082 | 7.9469 | 9.6474 | 8.8296 | 9.6919 | 9.1387 | 9.7422 | 9.3472 | 9.7996 | 9.5146 | 9.8655 | 9.6621 |
| 11 | .6088 | .9889 | .6481 | .8364 | .6926 | .1428 | .7431 | .3503 | .8006 | .5171 | .8667 | .6644 |
| 12 | .6094 | 8.0273 | .6488 | .8432 | .6934 | .1468 | .7440 | .3533 | .8016 | .5197 | .8679 | .6668 |
| 13 | .6100 | .0627 | .6495 | .8498 | .6942 | .1507 | .7449 | .3563 | .8027 | .5223 | .8691 | .6691 |
| 14 | .6106 | .0955 | .6502 | .8564 | .6950 | .1547 | .7458 | .3593 | .8037 | .5248 | .8703 | .6715 |
| 15 | 9.6112 | 8.1260 | 9.6509 | 8.8628 | 9.6958 | 9.1586 | 9.7467 | 9.3623 | 9.8047 | 9.5274 | 9.8715 | 9.6738 |
| 16 | .6119 | .1547 | .6516 | .8692 | .6966 | .1625 | .7476 | .3653 | .8058 | .5300 | .8727 | .6762 |
| 17 | .6125 | .1816 | .6523 | .8756 | .6974 | .1664 | .7485 | .3683 | .8068 | .5325 | .8739 | .6785 |
| 18 | .6131 | .2071 | .6530 | .8818 | .6982 | .1703 | .7494 | .3713 | .8078 | .5351 | .8751 | .6809 |
| 19 | .6137 | .2312 | .6538 | .8880 | .6990 | .1741 | .7503 | .3742 | .8089 | .5376 | .8763 | .6832 |
| 20 | 9.6144 | 8.2541 | 9.6545 | 8.8941 | 9.6998 | 9.1779 | 9.7512 | 9.3772 | 9.8099 | 9.5401 | 9.8775 | 9.6856 |
| 21 | .6150 | .2759 | .6552 | .9002 | .7006 | .1817 | .7522 | .3801 | .8110 | .5427 | .8787 | .6879 |
| 22 | .6156 | .2967 | .6559 | .9062 | .7014 | .1855 | .7531 | .3831 | .8120 | .5452 | .8799 | .6903 |
| 23 | .6163 | .3166 | .6566 | .9121 | .7022 | .1893 | .7540 | .3860 | .8131 | .5477 | .8812 | .6926 |
| 24 | .6169 | .3357 | .6573 | .9180 | .7030 | .1930 | .7549 | .3889 | .8141 | .5502 | .8824 | .6949 |
| 25 | 9.6175 | 8.3540 | 9.6580 | 8.9238 | 9.7038 | 9.1967 | 9.7558 | 9.3918 | 9.8152 | 9.5528 | 9.8836 | 9.6973 |
| 26 | .6182 | .3717 | .6588 | .9295 | .7047 | .2004 | .7568 | .3947 | .8162 | .5553 | .8848 | .6996 |
| 27 | .6188 | .3887 | .6595 | .9352 | .7055 | .2041 | .7577 | .3976 | .8173 | .5578 | .8861 | .7019 |
| 28 | .6194 | .4051 | .6602 | .9408 | .7063 | .2078 | .7586 | .4005 | .8184 | .5603 | .8873 | .7043 |
| 29 | .6201 | .4210 | .6609 | .9464 | .7071 | .2114 | .7595 | .4033 | .8194 | .5628 | .8885 | .7066 |
| 30 | 9.6207 | 8.4363 | 9.6616 | 8.9519 | 9.7079 | 9.2150 | 9.7605 | 9.4062 | 9.8205 | 9.5653 | 9.8898 | 9.7089 |
| 31 | .6214 | .4512 | .6624 | .9573 | .7088 | .2186 | .7614 | .4090 | .8216 | .5677 | .8910 | .7112 |
| 32 | .6220 | .4657 | .6631 | .9627 | .7096 | .2222 | .7624 | .4119 | .8227 | .5702 | .8923 | .7136 |
| 33 | .6226 | .4796 | .6638 | .9681 | .7104 | .2258 | .7633 | .4147 | .8237 | .5727 | .8935 | .7159 |
| 34 | .6233 | .4932 | .6645 | .9734 | .7112 | .2293 | .7642 | .4175 | .8248 | .5752 | .8948 | .7182 |
| 35 | 9.6239 | 8.5064 | 9.6653 | 8.9787 | 9.7121 | 9.2329 | 9.7652 | 9.4204 | 9.8259 | 9 5777 | 9.8961 | 9.7205 |
| 36 | .6246 | .5192 | .6660 | .9839 | .7129 | .2364 | .7661 | .4232 | .8270 | .5801 | .8973 | .7228 |
| 37 | .9252 | .5318 | .6667 | .9891 | .7137 | .2399 | .7671 | .4260 | .8281 | .5826 | .8986 | .7251 |
| 38 | .6259 | .5440 | .6675 | .9942 | .7146 | .2434 | .7680 | .4288 | .8292 | .5850 | .8999 | .7275 |
| 39 | .6265 | .5559 | .6682 | .9993 | .7154 | .2468 | .7690 | .4316 | .8303 | .5875 | .9011 | .7298 |
| 40 | 9.6272 | 8.5675 | 9.6690 | 9.0043 | 9.7162 | 9.2503 | 9.7699 | 9.4343 | 9.8314 | 9.5900 | 9.9024 | 9.7321 |
| 41 | .6279 | .5788 | .6697 | .0093 | .7171 | .2537 | .7709 | .4371 | .8325 | .5924 | .9037 | .7344 |
| 42 | .6285 | .5899 | .6704 | .0142 | .7179 | .2571 | .7718 | .4399 | .8336 | .5948 | .9050 | .7367 |
| 43 | .6292 | .6008 | .6712 | .0191 | .7187 | .2605 | .7728 | .4426 | .8347 | .5973 | .9063 | .7390 |
| 44 | .6298 | .6114 | .6719 | .0240 | .7196 | .2639 | .7738 | .4454 | .8358 | .5997 | .9075 | .7413 |
| 45 | 9.6305 | 8.6218 | 9.6727 | 9.0288 | 9.7204 | 9.2673 | 9.7747 | 9.4481 | 9.8369 | 9.6022 | 9.9088 | 9.7436 |
| 46 | .6311 | .6320 | .6734 | .0336 | .7213 | .2706 | .7757 | .4509 | .8380 | .6046 | .9101 | .7459 |
| 47 | .6318 | .6419 | .6742 | .0384 | .7221 | .2740 | .7767 | .4536 | .8391 | .6070 | .9114 | .7482 |
| 48 | .6325 | .6517 | .6749 | .0431 | .7230 | .2773 | .7776 | .4563 | .8402 | .6094 | .9127 | .7505 |
| 49 | .6331 | .6613 | .6757 | .0478 | .7238 | .2806 | .7786 | .4590 | .8414 | .6119 | .9140 | .7529 |
| 50 | 9.6338 | 8.6707 | 9.6764 | 9.0524 | 9.7247 | 9.2839 | 9.7796 | 9.4617 | 9.8425 | 9.6143 | 9.9154 | 9.7552 |
| 51 | .6345 | .6799 | .6772 | .0570 | .7256 | .2872 | .7806 | .4644 | .8436 | .6167 | .9167 | .7575 |
| 52 | .6351 | .6890 | .6779 | .0616 | .7264 | .2905 | .7815 | .4671 | .8447 | .6191 | .9180 | .7598 |
| 53 | .6358 | .6979 | .6787 | .0662 | .7273 | .2937 | .7825 | .4698 | .8459 | .6215 | .9193 | .7621 |
| 54 | .6365 | .7067 | .6795 | .0707 | .7281 | .2970 | .7835 | .4725 | .8470 | .6239 | .9206 | .7644 |
| 55 | 9.6372 | 8.7153 | 9.6802 | 9.0752 | 9.7290 | 9.3002 | 9.7845 | 9.4752 | 9.8481 | 9.6263 | 9.9220 | 9.7667 |
| 56 | .6378 | .7237 | .6810 | .0796 | .7299 | .3034 | .7855 | .4778 | .8493 | .6287 | .9233 | .7690 |
| 57 | .6385 | .7321 | .6818 | .0840 | .7307 | .3066 | .7865 | .4805 | .8504 | .6311 | .9246 | .7713 |
| 58 | .6392 | .7402 | .6825 | .0884 | .7316 | .3098 | .7875 | .4831 | .8516 | .6335 | .9260 | .7736 |
| 59 | .6399 | .7483 | .6833 | .0928 | .7324 | .3130 | .7885 | .4858 | .8527 | .6359 | .9273 | .7759 |
| 60 | 9.6406 | 8 7563 | 9.6841 | 9.0971 | 9.7333 | 9.3162 | 9.7895 | 9.4884 | 9.8539 | 9.6383 | 9.9287 | 9.7782 |

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — } For Midnight, A + }

ARGUMENT = ELAPSED TIME.

{ For Noon or Midnight, B —

| Elapsed Time. | 18$^{h.}$ | | 19$^{h.}$ | | 20$^{h.}$ | | 21$^{h.}$ | | 22$^{h.}$ | | 23$^{h.}$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. | Log. A. | Log. B. |
| m | | | | | | | | | | | | |
| 0 | 9.9287 | 9.7782 | 0.0172 | 9.9167 | 0.1249 | 0.0625 | 0.2623 | 0.2279 | 0.4523 | 0.4372 | 0.7689 | 0.7652 |
| 1 | .9300 | .7804 | .0188 | .9190 | .1269 | .0650 | .2649 | .2309 | .4562 | .4414 | .7765 | .7729 |
| 2 | .9314 | .7827 | .0204 | .9213 | .1290 | .0676 | .2676 | .2339 | .4601 | .4455 | .7842 | .7807 |
| 3 | .9327 | .7850 | .0221 | .9237 | .1310 | .0701 | .2702 | .2370 | .4640 | .4497 | .7920 | .7886 |
| 4 | .9341 | .7873 | .0237 | .9260 | .1330 | .0727 | .2729 | .2401 | .4680 | .4540 | .8000 | .7967 |
| 5 | 9.9355 | 9.7896 | 0.0253 | 9.9284 | 0.1351 | 0.0753 | 0.2756 | 0.2431 | 0.4720 | 0.4582 | 0.8081 | 0.8049 |
| 6 | .9368 | .7919 | .0270 | .9307 | .1371 | .0779 | .2783 | .2462 | .4761 | .4625 | .8163 | .8133 |
| 7 | .9382 | .7942 | .0286 | .9331 | .1392 | .0805 | .2810 | .2493 | .4801 | .4668 | .8247 | .8218 |
| 8 | .9396 | .7965 | .0303 | .9355 | .1412 | .0830 | .2838 | .2524 | .4842 | .4711 | .8333 | .8305 |
| 9 | .9410 | .7988 | .0319 | .9378 | .1433 | .0856 | .2865 | .2556 | .4884 | .4755 | .8420 | .8393 |
| 10 | 9.9424 | 9.8011 | 0.0336 | 9.9402 | 0.1454 | 0.0882 | 0.2893 | 0.2587 | 0.4926 | 0.4799 | 0.8508 | 0.8483 |
| 11 | .9437 | .8034 | .0353 | .9426 | .1475 | .0909 | .2921 | .2619 | .4968 | .4844 | .8599 | .8574 |
| 12 | .9451 | .8057 | .0370 | .9449 | .1496 | .0935 | .2949 | .2650 | .5010 | .4889 | .8691 | .8667 |
| 13 | .9465 | .8080 | .0386 | .9473 | .1517 | .0961 | .2977 | .2682 | .5053 | .4934 | .8786 | .8763 |
| 14 | .9479 | .8103 | .0403 | .9497 | .1538 | .0987 | .3005 | .2714 | .5097 | .4980 | .8882 | .8860 |
| 15 | 9.9493 | 9.8126 | 0.0420 | 9.9520 | 0.1559 | 0.1013 | 0.3034 | 0.2746 | 0.5140 | 0.5026 | 0.8980 | 0.8959 |
| 16 | .9508 | .8149 | .0437 | .9544 | .1581 | .1040 | .3063 | .2778 | .5184 | .5072 | .9080 | .9060 |
| 17 | .9522 | .8172 | .0454 | .9568 | .1602 | .1066 | .3091 | .2811 | .5229 | .5118 | .9183 | .9164 |
| 18 | .9536 | .8195 | .0472 | .9592 | .1623 | .1093 | .3120 | .2843 | .5274 | .5165 | .9288 | .9270 |
| 19 | .9550 | .8218 | .0489 | .9616 | .1645 | .1119 | .3150 | .2876 | .5319 | .5213 | .9396 | .9378 |
| 20 | 9.9564 | 9.8241 | 0.0506 | 9.9640 | 0.1667 | 0.1146 | 0.3179 | 0.2909 | 0.5365 | 0.5261 | 0.9506 | 0.9489 |
| 21 | .9579 | .8264 | .0523 | .9664 | .1689 | .1173 | .3208 | .2942 | .5411 | .5309 | .9618 | .9603 |
| 22 | .9593 | .8287 | .0541 | .9687 | .1711 | .1200 | .3238 | .2975 | .5458 | .5358 | .9734 | .9719 |
| 23 | .9607 | .8310 | .0558 | .9711 | .1733 | .1226 | .3268 | .3008 | .5505 | .5407 | .9853 | .9839 |
| 24 | .9622 | .8333 | .0576 | .9735 | .1755 | .1253 | .3298 | .3041 | .5553 | .5457 | .9975 | .9961 |
| 25 | 9.9636 | 9.8356 | 0.0593 | 9.9760 | 0.1777 | 0.1280 | 0.3328 | 0.3075 | 0.5601 | 0.5507 | 1.0100 | 1.0087 |
| 26 | .9651 | .8379 | .0611 | .9784 | .1799 | .1308 | .3359 | .3109 | .5649 | .5557 | .0228 | .0216 |
| 27 | .9665 | .8402 | .0628 | .9808 | .1821 | .1335 | .3389 | .3143 | .5698 | .5608 | .0361 | .0350 |
| 28 | .9680 | .8425 | .0646 | .9832 | .1844 | .1362 | .3420 | .3177 | .5748 | .5660 | .0497 | .0487 |
| 29 | .9695 | .8448 | .0664 | .9856 | .1867 | .1389 | .3451 | .3211 | .5798 | .5712 | .0638 | .0628 |
| 30 | 9.9709 | 9.8471 | 0.0682 | 9.9880 | 0.1889 | 0.1417 | 0.3482 | 0.3245 | 0.5848 | 0.5764 | 1.0783 | 1.0774 |
| 31 | .9724 | .8494 | .0700 | .9904 | .1912 | .1444 | .3514 | .3280 | .5899 | .5817 | .0934 | .0925 |
| 32 | .9739 | .8517 | .0718 | .9929 | .1935 | .1472 | .3545 | .3315 | .5951 | .5871 | .1089 | .1081 |
| 33 | .9754 | .8540 | .0736 | .9953 | .1958 | .1499 | .3577 | .3350 | .6003 | .5925 | .1250 | .1242 |
| 34 | .9769 | .8563 | .0754 | .9977 | .1981 | .1527 | .3609 | .3385 | .6056 | .5979 | .1416 | .1409 |
| 35 | 9.9784 | 9.8586 | 0.0772 | 0.0002 | 0.2004 | 0.1555 | 0.3641 | 0.3420 | 0.6110 | 0.6034 | 1.1590 | 1.1583 |
| 36 | .9798 | .8609 | .0790 | .0026 | .2028 | .1582 | .3674 | .3456 | .6164 | .6090 | .1770 | .1764 |
| 37 | .9813 | .8632 | .0809 | .0051 | .2051 | .1610 | .3706 | .3491 | .6218 | .6147 | .1958 | .1952 |
| 38 | .9829 | .8655 | .0827 | .0075 | .2075 | .1638 | .3739 | .3527 | .6273 | .6204 | .2154 | .2149 |
| 39 | .9844 | .8678 | .0845 | .0100 | .2098 | .1667 | .3772 | .3563 | .6329 | .6261 | .2359 | .2354 |
| 40 | 9.9859 | 9.8701 | 0.0864 | 0.0124 | 0.2122 | 0.1695 | 0.3805 | 0.3599 | 0.6386 | 0.6319 | 1.2573 | 1.2569 |
| 41 | .9874 | .8724 | .0883 | .0149 | .2146 | .1723 | .3839 | .3636 | .6443 | .6378 | .2799 | .2795 |
| 42 | .9889 | .8748 | .0901 | .0173 | .2170 | .1751 | .3873 | .3673 | .6501 | .6438 | .3037 | .3033 |
| 43 | .9904 | .8771 | .0920 | .0198 | .2194 | .1780 | .3907 | .3710 | .6560 | .6498 | .3288 | .3285 |
| 44 | .9920 | .8794 | .0939 | .0223 | .2218 | .1808 | .3941 | .3747 | .6619 | .6559 | .3554 | .3552 |
| 45 | 9.9935 | 9.8817 | 0.0958 | 0.0248 | 0.2243 | 0.1837 | 0.3975 | 0.3784 | 0.6679 | 0.6621 | 1.3837 | 1.3835 |
| 46 | .9951 | .8840 | .0976 | .0272 | .2267 | .1866 | .4010 | .3822 | .6740 | .6684 | .4140 | .4138 |
| 47 | .9966 | .8863 | .0995 | .0297 | .2292 | .1895 | .4045 | .3859 | .6802 | .6747 | .4465 | .4463 |
| 48 | .9982 | .8887 | .1015 | .0322 | .2316 | .1924 | .4080 | .3897 | .6865 | .6811 | .4815 | .4814 |
| 49 | .9998 | .8910 | .1034 | .0347 | .2341 | .1953 | .4115 | .3936 | .6928 | .6876 | .5196 | .5195 |
| 50 | 0.0013 | 9.8933 | 0.1053 | 0.0372 | 0.2366 | 0.1982 | 0.4151 | 0.3974 | 0.6993 | 0.6942 | 1.5613 | 1.5612 |
| 51 | .0029 | .8956 | .1072 | .0397 | .2391 | .2011 | .4187 | .4013 | .7058 | .7008 | .6074 | .6073 |
| 52 | .0044 | .8980 | .1092 | .0422 | .2416 | .2040 | .4223 | .4052 | .7124 | .7076 | .6588 | .6587 |
| 53 | .0060 | .9003 | .1111 | .0447 | .2442 | .2070 | .4260 | .4091 | .7191 | .7144 | .7171 | .7171 |
| 54 | .0076 | .9026 | .1131 | .0473 | .2467 | .2099 | .4297 | .4130 | .7259 | .7214 | .7844 | .7843 |
| 55 | 0.0092 | 9.9050 | 0.1150 | 0.0498 | 0.2493 | 0.2129 | 0.4334 | 0.4170 | 0.7328 | 0.7284 | 1.8638 | 1.8638 |
| 56 | .0108 | .9073 | .1170 | .0523 | .2518 | .2159 | .4371 | .4210 | .7398 | .7355 | .9610 | .9610 |
| 57 | .0124 | .9096 | .1190 | .0548 | .2544 | .2189 | .4408 | .4250 | .7469 | .7428 | 2.0863 | 2.0863 |
| 58 | .0140 | .9120 | .1209 | .0574 | .2570 | .2219 | .4446 | .4291 | .7541 | .7501 | .2627 | .2627 |
| 59 | .0156 | .9143 | .1229 | .0599 | .2596 | .2249 | .4485 | .4331 | .7615 | .7576 | 2.5640 | 2.5640 |
| 60 | 0.0172 | 9.9167 | 0.1249 | 0.0625 | 0.2623 | 0.2279 | 0.4523 | 0.4372 | 0.7689 | 0.7652 | *Inf.* | *Inf.* |

# TABLE II.

## LOGARITHMS OF NUMBERS.

| Natural Numbers. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional Parts. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 0000 | 0043 | 0086 | 0128 | 0170 | 0212 | 0253 | 0294 | 0334 | 0374 | 4 | 8 | 12 | 17 | 21 | 25 | 29 | 33 | 37 |
| 11 | 0414 | 0453 | 0492 | 0531 | 0569 | 0607 | 0645 | 0682 | 0719 | 0755 | 4 | 8 | 11 | 15 | 19 | 23 | 26 | 30 | 34 |
| 12 | 0792 | 0828 | 0864 | 0899 | 0934 | 0969 | 1004 | 1038 | 1072 | 1106 | 3 | 7 | 10 | 14 | 17 | 21 | 24 | 28 | 31 |
| 13 | 1139 | 1173 | 1206 | 1239 | 1271 | 1303 | 1335 | 1367 | 1399 | 1430 | 3 | 6 | 10 | 13 | 16 | 19 | 23 | 26 | 29 |
| 14 | 1461 | 1492 | 1523 | 1553 | 1584 | 1614 | 1644 | 1673 | 1703 | 1732 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 |
| 15 | 1761 | 1790 | 1818 | 1847 | 1875 | 1903 | 1931 | 1959 | 1987 | 2014 | 3 | 6 | 8 | 11 | 14 | 17 | 20 | 22 | 25 |
| 16 | 2041 | 2068 | 2095 | 2122 | 2148 | 2175 | 2201 | 2227 | 2253 | 2279 | 3 | 5 | 8 | 11 | 13 | 16 | 18 | 21 | 24 |
| 17 | 2304 | 2330 | 2355 | 2380 | 2405 | 2430 | 2455 | 2480 | 2504 | 2529 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 22 |
| 18 | 2553 | 2577 | 2601 | 2625 | 2648 | 2672 | 2695 | 2718 | 2742 | 2765 | 2 | 5 | 7 | 9 | 12 | 14 | 16 | 19 | 21 |
| 19 | 2788 | 2810 | 2833 | 2856 | 2878 | 2900 | 2923 | 2945 | 2967 | 2989 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 |
| 20 | 3010 | 3032 | 3054 | 3075 | 3096 | 3118 | 3139 | 3160 | 3181 | 3201 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 17 | 19 |
| 21 | 3222 | 3243 | 3263 | 3284 | 3304 | 3324 | 3345 | 3365 | 3385 | 3404 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 22 | 3424 | 3444 | 3464 | 3483 | 3502 | 3522 | 3541 | 3560 | 3579 | 3598 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 | 17 |
| 23 | 3617 | 3636 | 3655 | 3674 | 3692 | 3711 | 3729 | 3747 | 3766 | 3784 | 2 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 |
| 24 | 3802 | 3820 | 3838 | 3856 | 3874 | 3892 | 3909 | 3927 | 3945 | 3962 | 2 | 4 | 5 | 7 | 9 | 11 | 12 | 14 | 16 |
| 25 | 3979 | 3997 | 4014 | 4031 | 4048 | 4065 | 4082 | 4099 | 4116 | 4133 | 2 | 3 | 5 | 7 | 9 | 10 | 12 | 14 | 15 |
| 26 | 4150 | 4166 | 4183 | 4200 | 4216 | 4232 | 4249 | 4265 | 4281 | 4298 | 2 | 3 | 5 | 7 | 8 | 10 | 11 | 13 | 15 |
| 27 | 4314 | 4330 | 4346 | 4362 | 4378 | 4393 | 4409 | 4425 | 4440 | 4456 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 13 | 14 |
| 28 | 4472 | 4487 | 4502 | 4518 | 4533 | 4548 | 4564 | 4579 | 4594 | 4609 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 |
| 29 | 4624 | 4639 | 4654 | 4669 | 4683 | 4698 | 4713 | 4728 | 4742 | 4757 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 |
| 30 | 4771 | 4786 | 4800 | 4814 | 4829 | 4843 | 4857 | 4871 | 4886 | 4900 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 |
| 31 | 4914 | 4928 | 4942 | 4955 | 4969 | 4983 | 4997 | 5011 | 5024 | 5038 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 |
| 32 | 5051 | 5065 | 5079 | 5092 | 5105 | 5119 | 5132 | 5145 | 5159 | 5172 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 |
| 33 | 5185 | 5198 | 5211 | 5224 | 5237 | 5250 | 5263 | 5276 | 5289 | 5302 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 12 |
| 34 | 5315 | 5328 | 5340 | 5353 | 5366 | 5378 | 5391 | 5403 | 5416 | 5428 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 |
| 35 | 5441 | 5453 | 5465 | 5478 | 5490 | 5502 | 5514 | 5527 | 5539 | 5551 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 |
| 36 | 5563 | 5575 | 5587 | 5599 | 5611 | 5623 | 5635 | 5647 | 5658 | 5670 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 |
| 37 | 5682 | 5694 | 5705 | 5717 | 5729 | 5740 | 5752 | 5763 | 5775 | 5786 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 |
| 38 | 5798 | 5809 | 5821 | 5832 | 5843 | 5855 | 5866 | 5877 | 5888 | 5899 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 |
| 39 | 5911 | 5922 | 5933 | 5944 | 5955 | 5966 | 5977 | 5988 | 5999 | 6010 | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 |
| 40 | 6021 | 6031 | 6042 | 6053 | 6064 | 6075 | 6085 | 6096 | 6107 | 6117 | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 10 |
| 41 | 6128 | 6138 | 6149 | 6160 | 6170 | 6180 | 6191 | 6201 | 6212 | 6222 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 42 | 6232 | 6243 | 6253 | 6263 | 6274 | 6284 | 6294 | 6304 | 6314 | 6325 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 43 | 6335 | 6345 | 6355 | 6365 | 6375 | 6385 | 6395 | 6405 | 6415 | 6425 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 44 | 6435 | 6444 | 6454 | 6464 | 6474 | 6484 | 6493 | 6503 | 6513 | 6522 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 45 | 6532 | 6542 | 6551 | 6561 | 6571 | 6580 | 6590 | 6599 | 6609 | 6618 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 46 | 6628 | 6637 | 6646 | 6656 | 6665 | 6675 | 6684 | 6693 | 6702 | 6712 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 8 |
| 47 | 6721 | 6730 | 6739 | 6749 | 6758 | 6767 | 6776 | 6785 | 6794 | 6803 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 |
| 48 | 6812 | 6821 | 6830 | 6839 | 6848 | 6857 | 6866 | 6875 | 6884 | 6893 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 |
| 49 | 6902 | 6911 | 6920 | 6928 | 6937 | 6946 | 6955 | 6964 | 6972 | 6981 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 |
| 50 | 6990 | 6998 | 7007 | 7016 | 7024 | 7033 | 7042 | 7050 | 7059 | 7067 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 51 | 7076 | 7084 | 7093 | 7101 | 7110 | 7118 | 7126 | 7135 | 7143 | 7152 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 52 | 7160 | 7168 | 7177 | 7185 | 7193 | 7202 | 7210 | 7218 | 7226 | 7235 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 |
| 53 | 7243 | 7251 | 7259 | 7267 | 7275 | 7284 | 7292 | 7300 | 7308 | 7316 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| 54 | 7324 | 7332 | 7340 | 7348 | 7356 | 7364 | 7372 | 7380 | 7388 | 7396 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |

# TABLE II.

## LOGARITHMS OF NUMBERS.

| Natural Numbers. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Proportional Parts. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 55 | 7404 | 7412 | 7419 | 7427 | 7435 | 7443 | 7451 | 7459 | 7466 | 7474 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 56 | 7482 | 7490 | 7497 | 7505 | 7513 | 7520 | 7528 | 7536 | 7543 | 7551 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 57 | 7559 | 7566 | 7574 | 7582 | 7589 | 7597 | 7604 | 7612 | 7619 | 7627 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 58 | 7634 | 7642 | 7649 | 7657 | 7664 | 7672 | 7679 | 7686 | 7694 | 7701 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 59 | 7709 | 7716 | 7723 | 7731 | 7738 | 7745 | 7752 | 7760 | 7767 | 7774 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 60 | 7782 | 7789 | 7796 | 7803 | 7810 | 7818 | 7825 | 7832 | 7839 | 7846 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 61 | 7853 | 7860 | 7868 | 7875 | 7882 | 7889 | 7896 | 7903 | 7910 | 7917 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 62 | 7924 | 7931 | 7938 | 7945 | 7952 | 7959 | 7966 | 7973 | 7980 | 7987 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 |
| 63 | 7993 | 8000 | 8007 | 8014 | 8021 | 8028 | 8035 | 8041 | 8048 | 8055 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 64 | 8062 | 8069 | 8075 | 8082 | 8089 | 8096 | 8102 | 8109 | 8116 | 8122 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 65 | 8129 | 8136 | 8142 | 8149 | 8156 | 8162 | 8169 | 8176 | 8182 | 8189 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 66 | 8195 | 8202 | 8209 | 8215 | 8222 | 8228 | 8235 | 8241 | 8248 | 8254 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 67 | 8261 | 8267 | 8274 | 8280 | 8287 | 8293 | 8299 | 8306 | 8312 | 8319 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 68 | 8325 | 8331 | 8338 | 8344 | 8351 | 8357 | 8363 | 8370 | 8376 | 8382 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 69 | 8388 | 8395 | 8401 | 8407 | 8414 | 8420 | 8426 | 8432 | 8439 | 8445 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 70 | 8451 | 8457 | 8463 | 8470 | 8476 | 8482 | 8488 | 8494 | 8500 | 8506 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 71 | 8513 | 8519 | 8525 | 8531 | 8537 | 8543 | 8549 | 8555 | 8561 | 8567 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 72 | 8573 | 8579 | 8585 | 8591 | 8597 | 8603 | 8609 | 8615 | 8621 | 8627 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 73 | 8633 | 8639 | 8645 | 8651 | 8657 | 8663 | 8669 | 8675 | 8681 | 8686 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 74 | 8692 | 8698 | 8704 | 8710 | 8716 | 8722 | 8727 | 8733 | 8739 | 8745 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 75 | 8751 | 8756 | 8762 | 8768 | 8774 | 8779 | 8785 | 8791 | 8797 | 8802 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 76 | 8808 | 8814 | 8820 | 8825 | 8831 | 8837 | 8842 | 8848 | 8854 | 8859 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 77 | 8865 | 8871 | 8876 | 8882 | 8887 | 8893 | 8899 | 8904 | 8910 | 8915 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 78 | 8921 | 8927 | 8932 | 8938 | 8943 | 8949 | 8954 | 8960 | 8965 | 8971 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 79 | 8976 | 8982 | 8987 | 8993 | 8998 | 9004 | 9009 | 9015 | 9020 | 9025 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 80 | 9031 | 9036 | 9042 | 9047 | 9053 | 9058 | 9063 | 9069 | 9074 | 9079 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 81 | 9085 | 9090 | 9096 | 9101 | 9106 | 9112 | 9117 | 9122 | 9128 | 9133 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 82 | 9138 | 9143 | 9149 | 9154 | 9159 | 9165 | 9170 | 9175 | 9180 | 9186 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 83 | 9191 | 9196 | 9201 | 9206 | 9212 | 9217 | 9222 | 9227 | 9232 | 9238 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 84 | 9243 | 9248 | 9253 | 9258 | 9263 | 9269 | 9274 | 9279 | 9284 | 9289 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 85 | 9294 | 9299 | 9304 | 9309 | 9315 | 9320 | 9325 | 9330 | 9335 | 9340 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 86 | 9345 | 9350 | 9355 | 9360 | 9365 | 9370 | 9375 | 9380 | 9385 | 9390 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 87 | 9395 | 9400 | 9405 | 9410 | 9415 | 9420 | 9425 | 9430 | 9435 | 9440 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 88 | 9445 | 9450 | 9455 | 9460 | 9465 | 9469 | 9474 | 9479 | 9484 | 9489 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 89 | 9494 | 9499 | 9504 | 9509 | 9513 | 9518 | 9523 | 9528 | 9533 | 9538 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 90 | 9542 | 9547 | 9552 | 9557 | 9562 | 9566 | 9571 | 9576 | 9581 | 9586 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 91 | 9590 | 9595 | 9600 | 9605 | 9609 | 9614 | 9619 | 9624 | 9628 | 9633 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 92 | 9638 | 9643 | 9647 | 9652 | 9657 | 9661 | 9666 | 9671 | 9675 | 9680 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 93 | 9685 | 9689 | 9694 | 9699 | 9703 | 9708 | 9713 | 9717 | 9722 | 9727 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 94 | 9731 | 9736 | 9741 | 9745 | 9750 | 9754 | 9759 | 9763 | 9768 | 9773 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 95 | 9777 | 9782 | 9786 | 9791 | 9795 | 9800 | 9805 | 9809 | 9814 | 9818 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 96 | 9823 | 9827 | 9832 | 9836 | 9841 | 9845 | 9850 | 9854 | 9859 | 9863 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 97 | 9868 | 9872 | 9877 | 9881 | 9886 | 9890 | 9894 | 9899 | 9903 | 9908 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 98 | 9912 | 9917 | 9921 | 9926 | 9930 | 9934 | 9939 | 9943 | 9948 | 9952 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 99 | 9956 | 9961 | 9965 | 9969 | 9974 | 9978 | 9983 | 9987 | 9991 | 9996 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 |

# TABLE III. MEAN REFRACTION.

Barometer 30 inches. Fahrenheit's Thermometer 50°.

| Apparent Altitude. | Mean Refraction. | Apparent Altitude. | Mean Refraction. | Apparent Altitude. | Mean Refraction. | Apparent Altitude. | Mean Refraction. | Apparent Altitude. | Mean Refraction. |
|---|---|---|---|---|---|---|---|---|---|
|  |  | ° ′ | ′ ″ | ° ′ | ′ ″ | ° ′ | ′ ″ | ° ′ | ′ ″ |
| ° ′ | ′ ″ | 9 30 | 5 35.1 | 15 0 | 3 34.1 | 25 0 | 2 4.4 | 42 0 | 1 4.7 |
| 0 0 | 36 29.4 | 35 | 5 32.4 | 10 | 3 31.7 | 10 | 2 3.4 | 20 | 1 3.9 |
| 1 0 | 24 53.6 | 40 | 5 29.6 | 20 | 3 29.4 | 20 | 2 2.5 | 40 | 1 3.2 |
| 2 0 | 18 25.5 | 45 | 5 27.0 | 30 | 3 27.1 | 30 | 2 1.6 | 43 0 | 1 2.4 |
| 3 0 | 14 25.1 | 50 | 5 24.3 | 40 | 3 24.8 | 40 | 2 0.7 | 20 | 1 1.7 |
| 4 0 | 11 44.4 | 55 | 5 21.7 | 50 | 3 22.6 | 50 | 1 59.8 | 40 | 1 1.0 |
| 5 0 | 9 52.0 | 10 0 | 5 19.2 | 16 0 | 3 20.5 | 26 0 | 1 58.9 | 44 0 | 1 0.3 |
| 5 | 9 44.0 | 5 | 5 16.7 | 10 | 3 18.4 | 10 | 1 58.1 | 20 | 0 59.6 |
| 10 | 9 36.2 | 10 | 5 14.2 | 20 | 3 16.3 | 20 | 1 57.2 | 40 | 0 58.9 |
| 15 | 9 28.6 | 15 | 5 11.7 | 30 | 3 14.2 | 30 | 1 56.4 | 45 0 | 0 58.2 |
| 20 | 9 21.2 | 20 | 5 9.3 | 40 | 3 12.2 | 40 | 1 55.5 | 20 | 0 57.6 |
| 25 | 9 14.0 | 25 | 5 6.9 | 50 | 3 10.3 | 50 | 1 54.7 | 40 | 0 56.9 |
| 5 30 | 9 7.0 | 10 30 | 5 4.6 | 17 0 | 3 8.3 | 27 0 | 1 53.9 | 46 0 | 0 56.2 |
| 35 | 9 0.1 | 35 | 5 2.3 | 10 | 3 6.4 | 10 | 1 53.1 | 20 | 0 55.6 |
| 40 | 8 53.4 | 40 | 5 0.0 | 20 | 3 4.6 | 20 | 1 52.3 | 40 | 0 55.0 |
| 45 | 8 46.8 | 45 | 4 57.8 | 30 | 3 2.8 | 30 | 1 51.5 | 47 0 | 0 54.3 |
| 50 | 8 40.4 | 50 | 4 55.6 | 40 | 3 1.0 | 40 | 1 50.7 | 20 | 0 53.7 |
| 55 | 8 34.2 | 55 | 4 53.4 | 50 | 2 59.2 | 50 | 1 50.0 | 40 | 0 53.1 |
| 6 0 | 8 28.0 | 11 0 | 4 51.2 | 18 0 | 2 57.5 | 28 0 | 1 49.2 | 48 0 | 0 52.5 |
| 5 | 8 22.1 | 5 | 4 49.1 | 10 | 2 55.8 | 20 | 1 47.7 | 49 0 | 0 50.6 |
| 10 | 8 16.2 | 10 | 4 47.0 | 20 | 2 54.1 | 40 | 1 46.2 | 50 0 | 0 48.9 |
| 15 | 8 10.5 | 15 | 4 44.9 | 30 | 2 52.4 | 29 0 | 1 44.8 | 51 0 | 0 47.2 |
| 20 | 8 4.8 | 20 | 4 42.9 | 40 | 2 50.8 | 20 | 1 43.4 | 52 0 | 0 45.5 |
| 25 | 7 59.3 | 25 | 4 40.9 | 50 | 2 49.2 | 40 | 1 42.0 | 53 0 | 0 43.9 |
| 6 30 | 7 53.9 | 11 30 | 4 38.9 | 19 0 | 2 47.7 | 30 0 | 1 40.6 | 54 0 | 0 42.3 |
| 35 | 7 48.7 | 35 | 4 36.9 | 10 | 2 46.1 | 20 | 1 39.3 | 55 0 | 0 40.8 |
| 40 | 7 43.5 | 40 | 4 35.0 | 20 | 2 44.6 | 40 | 1 38.0 | 56 0 | 0 39.3 |
| 45 | 7 38.4 | 45 | 4 33.1 | 30 | 2 43.1 | 31 0 | 1 36.7 | 57 0 | 0 37.8 |
| 50 | 7 33.5 | 50 | 4 31.2 | 40 | 2 41.6 | 20 | 1 35.5 | 58 0 | 0 36.4 |
| 55 | 7 28.6 | 55 | 4 29.4 | 50 | 2 40.2 | 40 | 1 34.2 | 59 0 | 0 35.0 |
| 7 0 | 7 23.8 | 12 0 | 4 27.5 | 20 0 | 2 38.8 | 32 0 | 1 33.0 | 60 0 | 0 33.6 |
| 5 | 7 19.2 | 5 | 4 25.7 | 10 | 2 37.4 | 20 | 1 31.8 | 61 0 | 0 32.3 |
| 10 | 7 14.6 | 10 | 4 23.9 | 20 | 2 36.0 | 40 | 1 30.7 | 62 0 | 0 31.0 |
| 15 | 7 10.1 | 15 | 4 22.2 | 30 | 2 34.6 | 33 0 | 1 29.5 | 63 0 | 0 29.7 |
| 20 | 7 5.7 | 20 | 4 20.4 | 40 | 2 33.3 | 20 | 1 28.4 | 64 0 | 0 28.4 |
| 25 | 7 1.4 | 25 | 4 18.7 | 50 | 2 32.0 | 40 | 1 27.3 | 65 0 | 0 27.2 |
| 7 30 | 6 57.1 | 12 30 | 4 17.0 | 21 0 | 2 30.7 | 34 0 | 1 26.2 | 66 0 | 0 25.9 |
| 35 | 6 53.0 | 35 | 4 15.3 | 10 | 2 29.4 | 20 | 1 25.1 | 67 0 | 0 24.7 |
| 40 | 6 48.9 | 40 | 4 13.6 | 20 | 2 28.1 | 40 | 1 24.1 | 68 0 | 0 23.6 |
| 45 | 6 44.9 | 45 | 4 12.0 | 30 | 2 26.9 | 35 0 | 1 23.1 | 69 0 | 0 22.4 |
| 50 | 6 41.0 | 50 | 4 10.4 | 40 | 2 25.7 | 20 | 1 22.0 | 70 0 | 0 21.2 |
| 55 | 6 37.1 | 55 | 4 8.8 | 50 | 2 24.5 | 40 | 1 21.0 | 71 0 | 0 20.1 |
| 8 0 | 6 33.3 | 13 0 | 4 7.2 | 22 0 | 2 23.3 | 36 0 | 1 20.1 | 72 0 | 0 18.9 |
| 5 | 6 29.6 | 5 | 4 5.6 | 10 | 2 22.1 | 20 | 1 19.1 | 73 0 | 0 17.8 |
| 10 | 6 25.9 | 10 | 4 4.1 | 20 | 2 20.9 | 40 | 1 18.2 | 74 0 | 0 16.7 |
| 15 | 6 22.3 | 15 | 4 2.6 | 30 | 2 19.8 | 37 0 | 1 17.2 | 75 0 | 0 15.6 |
| 20 | 6 18.8 | 20 | 4 1.0 | 40 | 2 18.7 | 20 | 1 16.3 | 76 0 | 0 14.5 |
| 25 | 6 15.3 | 25 | 3 59.6 | 50 | 2 17.5 | 40 | 1 15.4 | 77 0 | 0 13.5 |
| 8 30 | 6 11.9 | 13 30 | 3 58.1 | 23 0 | 2 16.4 | 38 0 | 1 14.5 | 78 0 | 0 12.4 |
| 35 | 6 8.5 | 35 | 3 56.6 | 10 | 2 15.4 | 20 | 1 13.6 | 79 0 | 0 11.3 |
| 40 | 6 5.2 | 40 | 3 55.2 | 20 | 2 14.3 | 40 | 1 12.7 | 80 0 | 0 10.3 |
| 45 | 6 2.0 | 45 | 3 53.7 | 30 | 2 13.3 | 39 0 | 1 11.9 | 81 0 | 0 9.2 |
| 50 | 5 58.8 | 50 | 3 52.3 | 40 | 2 12.2 | 20 | 1 11.0 | 82 0 | 0 8.2 |
| 55 | 5 55.7 | 55 | 3 50.9 | 50 | 2 11.2 | 40 | 1 10.2 | 83 0 | 0 7.2 |
| 9 0 | 5 52.6 | 14 0 | 3 49.5 | 24 0 | 2 10.2 | 40 0 | 1 9.4 | 84 0 | 0 6.1 |
| 5 | 5 49.6 | 10 | 3 46.8 | 10 | 2 9.2 | 20 | 1 8.6 | 85 0 | 0 5.1 |
| 10 | 5 46.6 | 20 | 3 44.2 | 20 | 2 8.2 | 40 | 1 7.8 | 86 0 | 0 4.1 |
| 15 | 5 43.6 | 30 | 3 41.6 | 30 | 2 7.2 | 41 0 | 1 7.0 | 87 0 | 0 3.1 |
| 20 | 5 40.7 | 40 | 3 39.0 | 40 | 2 6.2 | 20 | 1 6.2 | 88 0 | 0 2.0 |
| 25 | 5 37.9 | 50 | 3 36.5 | 50 | 2 5.3 | 40 | 1 5.4 | 89 0 | 0 1.0 |
| 9 30 | 5 35.1 | 15 0 | 3 34.1 | 25 0 | 2 4.4 | 42 0 | 1 4.7 | 90 0 | 0 0.0 |

# TABLE III. A.

Correction of the Mean Refraction for the Height of the Barometer.

| Barometer. | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | Barometer. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0′ | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | |
| Subtract. | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | Add. |
| 27.50 | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 23 | 25 | 28 | 30 | 33 | 35 | 38 | 40 | 43 | 45 | 48 | 51 | |
| 27.55 | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 22 | 25 | 27 | 30 | 32 | 35 | 37 | 40 | 42 | 45 | 47 | 50 | |
| 27.60 | 0 | 2 | 5 | 7 | 10 | 12 | 14 | 17 | 19 | 22 | 24 | 27 | 29 | 31 | 34 | 36 | 39 | 41 | 44 | 46 | 49 | |
| 27.65 | 0 | 2 | 5 | 7 | 9 | 12 | 14 | 16 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 36 | 38 | 40 | 43 | 45 | 48 | |
| 27.70 | 0 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 18 | 21 | 23 | 25 | 28 | 30 | 32 | 35 | 37 | 39 | 42 | 44 | 47 | |
| 27.75 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 | 23 | 25 | 27 | 29 | 32 | 34 | 36 | 39 | 41 | 43 | 46 | |
| 27.80 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 18 | 20 | 22 | 24 | 27 | 29 | 31 | 33 | 35 | 38 | 40 | 42 | 45 | |
| 27.85 | 0 | 2 | 4 | 6 | 9 | 11 | 13 | 15 | 17 | 19 | 22 | 24 | 26 | 28 | 30 | 32 | 35 | 37 | 39 | 41 | 44 | |
| 27.90 | 0 | 2 | 4 | 6 | 8 | 10 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 30 | 32 | 34 | 36 | 38 | 40 | 43 | |
| 27.95 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 42 | |
| 28.00 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 41 | |
| 28.05 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | |
| 28.10 | 0 | 2 | 4 | 6 | 8 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 34 | 36 | 38 | |
| 28.15 | 0 | 2 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 37 | |
| 28.20 | 0 | 2 | 4 | 5 | 7 | 9 | 11 | 13 | 14 | 16 | 18 | 20 | 22 | 24 | 25 | 27 | 29 | 31 | 33 | 35 | 36 | |
| 28.25 | 0 | 2 | 3 | 5 | 7 | 9 | 10 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 26 | 28 | 30 | 32 | 34 | 35 | |
| 28.30 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 14 | 15 | 17 | 19 | 21 | 22 | 24 | 26 | 27 | 29 | 31 | 33 | 34 | |
| 28.35 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 13 | 15 | 17 | 18 | 20 | 22 | 23 | 25 | 27 | 28 | 30 | 32 | 33 | |
| 28.40 | 0 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 14 | 16 | 18 | 19 | 21 | 23 | 24 | 26 | 27 | 29 | 31 | 32 | |
| 28.45 | 0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 16 | 17 | 19 | 20 | 22 | 23 | 25 | 27 | 28 | 30 | 31 | |
| 28.50 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 26 | 27 | 29 | 30 | 31.50 |
| 28.55 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 15 | 16 | 17 | 19 | 20 | 22 | 23 | 25 | 26 | 28 | 29 | 31.45 |
| 28.60 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 13 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 25 | 27 | 28 | 31.40 |
| 28.65 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 14 | 15 | 16 | 18 | 19 | 20 | 22 | 23 | 25 | 26 | 27 | 31.35 |
| 28.70 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 12 | 13 | 14 | 16 | 17 | 18 | 20 | 21 | 22 | 24 | 25 | 26 | 31.30 |
| 28.75 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 20 | 21 | 23 | 24 | 25 | 31.25 |
| 28.80 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 19 | 21 | 22 | 23 | 24 | 31.20 |
| 28 85 | 0 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 13 | 14 | 15 | 16 | 17 | 19 | 20 | 21 | 22 | 23 | 31.15 |
| 28.90 | 0 | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 31.10 |
| 28.95 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 31.05 |
| 29.00 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 31.00 |
| 29.05 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 30.95 |
| 29.10 | 0 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 17 | 18 | 30.90 |
| 29.15 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 17 | 30.85 |
| 29.20 | 0 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 30.80 |
| 29.25 | 0 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 14 | 15 | 30.75 |
| 29.30 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 13 | 14 | 30.70 |
| 29.35 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 13 | 13 | 30.65 |
| 29.40 | 0 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 12 | 12 | 30.60 |
| 29.45 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 11 | 30.55 |
| 29.50 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 30.50 |
| 29.55 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 30.45 |
| 29.60 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 8 | 8 | 30.40 |
| 29.65 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 30.35 |
| 29.70 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 30.30 |
| 29.75 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 30.25 |
| 29.80 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 30.20 |
| 29.85 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 30.15 |
| 29.90 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 30.10 |
| 29.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 30.05 |
| 30.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30.00 |
| Subtract. | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | Add. |
| | 0′ | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | |
| Barometer. | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | Barometer. |

# TABLE III. B.

Correction of the Mean Refraction for the Height of the Thermometer.

| Thermom.<br>Add. | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | Thermom.<br>Add. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0′ | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | |
| | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | |
| —10° | 0″ | 4 | 8″ | 12″ | 16″ | 20″ | 24″ | 28″ | 33″ | 37″ | 41″ | 46″ | 50″ | 55″ | 60″ | 65″ | 70″ | 75″ | 80″ | 85″ | 90″ | —10° |
| — 8 | 0 | 4 | 8 | 12 | 15 | 19 | 23 | 27 | 31 | 36 | 40 | 44 | 48 | 53 | 58 | 62 | 67 | 72 | 77 | 82 | 87 | — 8 |
| — 6 | 0 | 4 | 7 | 11 | 15 | 19 | 22 | 26 | 30 | 34 | 38 | 42 | 47 | 51 | 55 | 60 | 64 | 69 | 74 | 79 | 84 | — 6 |
| — 4 | 0 | 4 | 7 | 11 | 14 | 18 | 22 | 25 | 29 | 33 | 37 | 41 | 45 | 49 | 53 | 57 | 62 | 66 | 71 | 76 | 80 | — 4 |
| — 2 | 0 | 3 | 7 | 10 | 14 | 17 | 21 | 24 | 28 | 31 | 35 | 39 | 43 | 47 | 51 | 55 | 59 | 64 | 68 | 72 | 77 | — 2 |
| 0 | 0 | 3 | 7 | 10 | 13 | 16 | 20 | 23 | 27 | 30 | 34 | 37 | 41 | 45 | 49 | 53 | 57 | 61 | 65 | 69 | 74 | 0 |
| 2 | 0 | 3 | 6 | 9 | 12 | 16 | 19 | 22 | 25 | 29 | 32 | 36 | 39 | 43 | 47 | 50 | 54 | 58 | 62 | 66 | 70 | 2 |
| 4 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 28 | 31 | 34 | 37 | 41 | 44 | 48 | 52 | 55 | 59 | 63 | 67 | 4 |
| 6 | 0 | 3 | 6 | 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 | 36 | 39 | 42 | 46 | 49 | 53 | 56 | 60 | 64 | 6 |
| 8 | 0 | 3 | 5 | 8 | 11 | 14 | 16 | 19 | 22 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 47 | 50 | 54 | 57 | 61 | 8 |
| 10 | 0 | 3 | 5 | 8 | 10 | 13 | 15 | 18 | 21 | 24 | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 48 | 51 | 54 | 58 | 10 |
| 11 | 0 | 2 | 5 | 7 | 10 | 13 | 15 | 18 | 20 | 23 | 26 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 53 | 56 | 11 |
| 12 | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 22 | 25 | 28 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 | 12 |
| 13 | 0 | 2 | 5 | 7 | 9 | 12 | 14 | 17 | 19 | 22 | 24 | 27 | 30 | 32 | 35 | 38 | 41 | 44 | 47 | 50 | 53 | 13 |
| 14 | 0 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 19 | 21 | 24 | 26 | 29 | 31 | 34 | 37 | 40 | 42 | 45 | 48 | 51 | 14 |
| 15 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 | 23 | 25 | 28 | 30 | 33 | 36 | 38 | 41 | 44 | 47 | 50 | 15 |
| 16 | 0 | 2 | 4 | 6 | 9 | 11 | 13 | 15 | 18 | 20 | 22 | 25 | 27 | 29 | 32 | 35 | 37 | 40 | 43 | 45 | 48 | 16 |
| 17 | 0 | 2 | 4 | 6 | 8 | 10 | 13 | 15 | 17 | 19 | 21 | 24 | 26 | 29 | 31 | 33 | 36 | 39 | 41 | 44 | 47 | 17 |
| 18 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 19 | 21 | 23 | 25 | 28 | 30 | 32 | 35 | 37 | 40 | 43 | 45 | 18 |
| 19 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 27 | 29 | 31 | 34 | 36 | 39 | 41 | 44 | 19 |
| 20 | 0 | 2 | 4 | 6 | 8 | 9 | 11 | 13 | 15 | 17 | 19 | 22 | 24 | 26 | 28 | 30 | 33 | 35 | 37 | 40 | 42 | 20 |
| 21 | 0 | 2 | 4 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 34 | 36 | 38 | 41 | 21 |
| 22 | 0 | 2 | 3 | 5 | 7 | 9 | 11 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 35 | 37 | 39 | 22 |
| 23 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 14 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 36 | 38 | 23 |
| 24 | 0 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 24 |
| 25 | 0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 13 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 25 |
| 26 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 11 | 12 | 14 | 15 | 17 | 19 | 20 | 22 | 24 | 26 | 28 | 29 | 31 | 33 | 26 |
| 27 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 23 | 25 | 26 | 38 | 30 | 32 | 27 |
| 28 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 10 | 11 | 12 | 14 | 15 | 17 | 19 | 20 | 22 | 23 | 25 | 27 | 29 | 30 | 28 |
| 29 | 0 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 11 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 22 | 24 | 26 | 27 | 29 | 29 |
| 30 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 9 | 10 | 11 | 13 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 26 | 28 | 30 |
| 31 | 0 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 15 | 16 | 17 | 19 | 20 | 22 | 23 | 25 | 26 | 31 |
| 32 | 0 | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 20 | 22 | 23 | 25 | 32 |
| 33 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 17 | 18 | 19 | 21 | 22 | 23 | 33 |
| 34 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 19 | 21 | 22 | 34 |
| 35 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 35 |
| 36 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 36 |
| 37 | 0 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 37 |
| 38 | 0 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 13 | 14 | 15 | 16 | 38 |
| 39 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 15 | 39 |
| 40 | 0 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 12 | 13 | 13 | 40 |
| 41 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 41 |
| 42 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 | 42 |
| 43 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 43 |
| 44 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 44 |
| 45 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 45 |
| 46 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 46 |
| 47 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 47 |
| 48 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 48 |
| 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 49 |
| 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| Add. | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | Add. |
| Thermom. | 0′ | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | Thermom. |
| | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | |

# TABLE III. B.

Correction of the Mean Refraction for the Height of the Thermometer.

| Thermom. | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | Thermom. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0′ | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | |
| Subtract. | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | Subtract. |
| 50° | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 0″ | 50° |
| 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 51 |
| 52 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 52 |
| 53 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 53 |
| 54 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 54 |
| 55 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 55 |
| 56 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 8 | 56 |
| 57 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 8 | 8 | 8 | 9 | 57 |
| 58 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 10 | 58 |
| 59 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 12 | 59 |
| 60 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 13 | 60 |
| 61 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 12 | 13 | 14 | 61 |
| 62 | 0 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 62 |
| 63 | 0 | 1 | 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 63 |
| 64 | 0 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 64 |
| 65 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 65 |
| 66 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 66 |
| 67 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 19 | 20 | 22 | 67 |
| 68 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 20 | 22 | 23 | 68 |
| 69 | 0 | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 15 | 16 | 17 | 19 | 20 | 21 | 23 | 24 | 69 |
| 70 | 0 | 1 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 12 | 14 | 16 | 17 | 18 | 20 | 21 | 22 | 24 | 25 | 70 |
| 71 | 0 | 1 | 2 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 19 | 20 | 22 | 23 | 25 | 27 | 71 |
| 72 | 0 | 1 | 2 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 13 | 14 | 16 | 17 | 18 | 20 | 21 | 23 | 25 | 26 | 28 | 72 |
| 73 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 13 | 14 | 16 | 18 | 19 | 21 | 22 | 24 | 26 | 27 | 29 | 73 |
| 74 | 0 | 1 | 3 | 4 | 5 | 7 | 8 | 10 | 11 | 12 | 14 | 15 | 17 | 18 | 20 | 22 | 23 | 25 | 27 | 28 | 30 | 74 |
| 75 | 0 | 1 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 13 | 14 | 16 | 18 | 19 | 21 | 22 | 24 | 26 | 28 | 29 | 31 | 75 |
| 76 | 0 | 1 | 3 | 4 | 6 | 7 | 9 | 10 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 23 | 25 | 27 | 29 | 31 | 32 | 76 |
| 77 | 0 | 1 | 3 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 16 | 17 | 19 | 21 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 77 |
| 78 | 0 | 2 | 3 | 5 | 6 | 8 | 9 | 11 | 13 | 14 | 16 | 18 | 20 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 78 |
| 79 | 0 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 79 |
| 80 | 0 | 2 | 3 | 5 | 7 | 8 | 10 | 12 | 14 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 80 |
| 81 | 0 | 2 | 3 | 5 | 7 | 9 | 10 | 12 | 14 | 16 | 18 | 20 | 21 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 81 |
| 82 | 0 | 2 | 4 | 5 | 7 | 9 | 11 | 13 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 31 | 33 | 35 | 37 | 40 | 82 |
| 83 | 0 | 2 | 4 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 34 | 36 | 38 | 41 | 83 |
| 84 | 0 | 2 | 4 | 6 | 8 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 26 | 28 | 30 | 32 | 35 | 37 | 39 | 42 | 84 |
| 85 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 29 | 31 | 33 | 36 | 38 | 40 | 43 | 85 |
| 86 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 23 | 25 | 27 | 29 | 32 | 34 | 37 | 39 | 42 | 44 | 86 |
| 87 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 17 | 19 | 21 | 23 | 25 | 28 | 30 | 32 | 35 | 38 | 40 | 43 | 45 | 87 |
| 88 | 0 | 2 | 4 | 6 | 8 | 10 | 13 | 15 | 17 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 36 | 38 | 41 | 44 | 46 | 88 |
| 89 | 0 | 2 | 4 | 6 | 9 | 11 | 13 | 15 | 17 | 20 | 22 | 24 | 27 | 29 | 32 | 34 | 37 | 39 | 42 | 45 | 48 | 89 |
| 90 | 0 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 | 23 | 25 | 27 | 30 | 32 | 35 | 38 | 40 | 43 | 46 | 49 | 90 |
| 91 | 0 | 2 | 4 | 7 | 9 | 11 | 14 | 16 | 18 | 21 | 23 | 25 | 28 | 31 | 33 | 36 | 39 | 41 | 44 | 47 | 50 | 91 |
| 92 | 0 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 19 | 21 | 24 | 26 | 29 | 31 | 34 | 37 | 39 | 42 | 45 | 48 | 51 | 92 |
| 93 | 0 | 2 | 5 | 7 | 9 | 12 | 14 | 17 | 19 | 22 | 24 | 27 | 29 | 32 | 35 | 37 | 40 | 43 | 46 | 49 | 52 | 93 |
| 94 | 0 | 2 | 5 | 7 | 10 | 12 | 14 | 17 | 19 | 22 | 25 | 27 | 30 | 33 | 35 | 38 | 41 | 44 | 47 | 50 | 53 | 94 |
| 95 | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 17 | 20 | 22 | 25 | 28 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 | 95 |
| 96 | 0 | 2 | 5 | 7 | 10 | 12 | 15 | 18 | 20 | 23 | 26 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 96 |
| 97 | 0 | 3 | 5 | 8 | 10 | 13 | 15 | 18 | 21 | 23 | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 50 | 53 | 56 | 97 |
| 98 | 0 | 3 | 5 | 8 | 10 | 13 | 16 | 18 | 21 | 24 | 27 | 29 | 32 | 35 | 38 | 41 | 44 | 48 | 51 | 54 | 58 | 98 |
| 99 | 0 | 3 | 5 | 8 | 11 | 13 | 16 | 19 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 49 | 52 | 55 | 59 | 99 |
| 100 | 0 | 3 | 5 | 8 | 11 | 13 | 16 | 19 | 22 | 25 | 28 | 31 | 34 | 37 | 40 | 43 | 46 | 50 | 53 | 56 | 60 | 100 |
| Subtract. | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | 30″ | 0″ | Subtract. |
| | 0 | | 1′ | | 2′ | | 3′ | | 4′ | | 5′ | | 6′ | | 7′ | | 8′ | | 9′ | | 10′ | |
| Thermom. | MEAN REFRACTION. | | | | | | | | | | | | | | | | | | | | | Thermom. |

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

| Side-real. | $0^{h.}$ | $1^{h.}$ | $2^{h.}$ | $3^{h.}$ | $4^{h.}$ | $5^{h.}$ | $6^{h.}$ | $7^{h.}$ | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 0 00.000 | 0 09.830 | 0 19.659 | 0 29.489 | 0 39.318 | 0 49.148 | 0 58.977 | 1 08.807 | | |
| 1 | 0 00.164 | 0 09.993 | 0 19.823 | 0 29.653 | 0 39.482 | 0 49.312 | 0 59.141 | 1 08.971 | 1 | 0.003 |
| 2 | 0 00.328 | 0 10.157 | 0 19.987 | 0 29.816 | 0 39.646 | 0 49.475 | 0 59.305 | 1 09.135 | 2 | .005 |
| 3 | 0 00.491 | 0 10.321 | 0 20.151 | 0 29.980 | 0 39.810 | 0 49.639 | 0 59.469 | 1 09.298 | 3 | .008 |
| 4 | 0 00.655 | 0 10.485 | 0 20.314 | 0 30.144 | 0 39.974 | 0 49.803 | 0 59.633 | 1 09.462 | 4 | .011 |
| 5 | 0 00.819 | 0 10.649 | 0 20.478 | 0 30.308 | 0 40.137 | 0 49.967 | 0 59.796 | 1 09.626 | 5 | .014 |
| 6 | 0 00.983 | 0 10.813 | 0 20.642 | 0 30.472 | 0 40.301 | 0 50.131 | 0 59.960 | 1 09.790 | 6 | .016 |
| 7 | 0 01.147 | 0 10.976 | 0 20.806 | 0 30.635 | 0 40.465 | 0 50.295 | 1 00.124 | 1 09.954 | 7 | .019 |
| 8 | 0 01.311 | 0 11.140 | 0 20.970 | 0 30.799 | 0 40.629 | 0 50.458 | 1 00.288 | 1 10.118 | 8 | .022 |
| 9 | 0 01.474 | 0 11.304 | 0 21.134 | 0 30.963 | 0 40.793 | 0 50.622 | 1 00.452 | 1 10.281 | 9 | .025 |
| 10 | 0 01.638 | 0 11.468 | 0 21.297 | 0 31.127 | 0 40.956 | 0 50.786 | 1 00.616 | 1 10.445 | 10 | .027 |
| 11 | 0 01.802 | 0 11.632 | 0 21.461 | 0 31.291 | 0 41.120 | 0 50.950 | 1 00.779 | 1 10.609 | 11 | .030 |
| 12 | 0 01.966 | 0 11.795 | 0 21.625 | 0 31.455 | 0 41.284 | 0 51.114 | 1 00.943 | 1 10.773 | 12 | .033 |
| 13 | 0 02.130 | 0 11.959 | 0 21.789 | 0 31.618 | 0 41.448 | 0 51.278 | 1 01.107 | 1 10.937 | 13 | .035 |
| 14 | 0 02.294 | 0 12.123 | 0 21.953 | 0 31.782 | 0 41.612 | 0 51.441 | 1 01.271 | 1 11.100 | 14 | .038 |
| 15 | 0 02.457 | 0 12.287 | 0 22.117 | 0 31.946 | 0 41.776 | 0 51.605 | 1 01.435 | 1 11.264 | 15 | .041 |
| 16 | 0 02.621 | 0 12.451 | 0 22.280 | 0 32.110 | 0 41.939 | 0 51.769 | 1 01.599 | 1 11.428 | 16 | .044 |
| 17 | 0 02.785 | 0 12.615 | 0 22.444 | 0 32.274 | 0 42.103 | 0 51.933 | 1 01.762 | 1 11.592 | 17 | .046 |
| 18 | 0 02.949 | 0 12.778 | 0 22.608 | 0 32.438 | 0 42.267 | 0 52.097 | 1 01.926 | 1 11.756 | 18 | .049 |
| 19 | 0 03.113 | 0 12.942 | 0 22.772 | 0 32.601 | 0 42.431 | 0 52.260 | 1 02.090 | 1 11.920 | 19 | .052 |
| 20 | 0 03.277 | 0 13.106 | 0 22.936 | 0 32.765 | 0 42.595 | 0 52.424 | 1 02.254 | 1 12.083 | 20 | .055 |
| 21 | 0 03.440 | 0 13.270 | 0 23.099 | 0 32.929 | 0 42.759 | 0 52.588 | 1 02.418 | 1 12.247 | 21 | .057 |
| 22 | 0 03.604 | 0 13.434 | 0 23.263 | 0 33.093 | 0 42.922 | 0 52.752 | 1 02.582 | 1 12.411 | 22 | .060 |
| 23 | 0 03.768 | 0 13.598 | 0 23.427 | 0 33.257 | 0 43.086 | 0 52.916 | 1 02.745 | 1 12.575 | 23 | .063 |
| 24 | 0 03.932 | 0 13.761 | 0 23.591 | 0 33.420 | 0 43.250 | 0 53.080 | 1 02.909 | 1 12.739 | 24 | .066 |
| 25 | 0 04.096 | 0 13.925 | 0 23.755 | 0 33.584 | 0 43.414 | 0 53.243 | 1 03.073 | 1 12.903 | 25 | .068 |
| 26 | 0 04.259 | 0 14.089 | 0 23.919 | 0 33.748 | 0 43.578 | 0 53.407 | 1 03.237 | 1 13.066 | 26 | .071 |
| 27 | 0 04.423 | 0 14.253 | 0 24.082 | 0 33.912 | 0 43.742 | 0 53.571 | 1 03.401 | 1 13.230 | 27 | .074 |
| 28 | 0 04.587 | 0 14.417 | 0 24.246 | 0 34.076 | 0 43.905 | 0 53.735 | 1 03.564 | 1 13.394 | 28 | .076 |
| 29 | 0 04.751 | 0 14.581 | 0 24.410 | 0 34.240 | 0 44.069 | 0 53.899 | 1 03.728 | 1 13.558 | 29 | .079 |
| 30 | 0 04.915 | 0 14.744 | 0 24.574 | 0 34.403 | 0 44.233 | 0 54.063 | 1 03.892 | 1 13.722 | 30 | .082 |
| 31 | 0 05.079 | 0 14.908 | 0 24.738 | 0 34.567 | 0 44.397 | 0 54.226 | 1 04.056 | 1 13.886 | 31 | .085 |
| 32 | 0 05.242 | 0 15.072 | 0 24.902 | 0 34.731 | 0 44.561 | 0 54.390 | 1 04.220 | 1 14.049 | 32 | .087 |
| 33 | 0 05.406 | 0 15.236 | 0 25.065 | 0 34.895 | 0 44.724 | 0 54.554 | 1 04.384 | 1 14.213 | 33 | .090 |
| 34 | 0 05.570 | 0 15.400 | 0 25.229 | 0 35.059 | 0 44.888 | 0 54.718 | 1 04.547 | 1 14.377 | 34 | .093 |
| 35 | 0 05.734 | 0 15.563 | 0 25.393 | 0 35.223 | 0 45.052 | 0 54.882 | 1 04.711 | 1 14.541 | 35 | .096 |
| 36 | 0 05.898 | 0 15.727 | 0 25.557 | 0 35.386 | 0 45.216 | 0 55.046 | 1 04.875 | 1 14.705 | 36 | .098 |
| 37 | 0 06.062 | 0 15.891 | 0 25.721 | 0 35.550 | 0 45.380 | 0 55.209 | 1 05.039 | 1 14.868 | 37 | .101 |
| 38 | 0 06.225 | 0 16.055 | 0 25.885 | 0 35.714 | 0 45.544 | 0 55.373 | 1 05.203 | 1 15.032 | 38 | .104 |
| 39 | 0 06.389 | 0 16.219 | 0 26.048 | 0 35.878 | 0 45.707 | 0 55.537 | 1 05.367 | 1 15.196 | 39 | .106 |
| 40 | 0 06.553 | 0 16.383 | 0 26.212 | 0 36.042 | 0 45.871 | 0 55.701 | 1 05.530 | 1 15.360 | 40 | .109 |
| 41 | 0 06.717 | 0 16.546 | 0 26.376 | 0 36.206 | 0 46.035 | 0 55.865 | 1 05.694 | 1 15.524 | 41 | .112 |
| 42 | 0 06.881 | 0 16.710 | 0 26.540 | 0 36.369 | 0 46.199 | 0 56.028 | 1 05.858 | 1 15.688 | 42 | .115 |
| 43 | 0 07.045 | 0 16.874 | 0 26.704 | 0 36.533 | 0 46.363 | 0 56.192 | 1 06.022 | 1 15.851 | 43 | .117 |
| 44 | 0 07.208 | 0 17.038 | 0 26.867 | 0 36.697 | 0 46.527 | 0 56.356 | 1 06.186 | 1 16.015 | 44 | .120 |
| 45 | 0 07.372 | 0 17.202 | 0 27.031 | 0 36.861 | 0 46.690 | 0 56.520 | 1 06.350 | 1 16.179 | 45 | .123 |
| 46 | 0 07.536 | 0 17.366 | 0 27.195 | 0 37.025 | 0 46.854 | 0 56.684 | 1 06.513 | 1 16.343 | 46 | .126 |
| 47 | 0 07.700 | 0 17.529 | 0 27.359 | 0 37.188 | 0 47.018 | 0 56.848 | 1 06.677 | 1 16.507 | 47 | .128 |
| 48 | 0 07.864 | 0 17.693 | 0 27.523 | 0 37.352 | 0 47.182 | 0 57.011 | 1 06.841 | 1 16.671 | 48 | .131 |
| 49 | 0 08.027 | 0 17.857 | 0 27.687 | 0 37.516 | 0 47.346 | 0 57.175 | 1 07.005 | 1 16.834 | 49 | .134 |
| 50 | 0 08.191 | 0 18.021 | 0 27.850 | 0 37.680 | 0 47.510 | 0 57.339 | 1 07.169 | 1 16.998 | 50 | .137 |
| 51 | 0 08.355 | 0 18.185 | 0 28.014 | 0 37.844 | 0 47.673 | 0 57.503 | 1 07.332 | 1 17.162 | 51 | .139 |
| 52 | 0 08.519 | 0 18.349 | 0 28.178 | 0 38.008 | 0 47.837 | 0 57.667 | 1 07.496 | 1 17.326 | 52 | .142 |
| 53 | 0 08.683 | 0 18.512 | 0 28.342 | 0 38.171 | 0 48.001 | 0 57.831 | 1 07.660 | 1 17.490 | 53 | .145 |
| 54 | 0 08.847 | 0 18.676 | 0 28.506 | 0 38.335 | 0 48.165 | 0 57.994 | 1 07.824 | 1 17.654 | 54 | .147 |
| 55 | 0 09.010 | 0 18.840 | 0 28.670 | 0 38.499 | 0 48.329 | 0 58.158 | 1 07.988 | 1 17.817 | 55 | .150 |
| 56 | 0 09.174 | 0 19.004 | 0 28.833 | 0 38.663 | 0 48.492 | 0 58.322 | 1 08.152 | 1 17.981 | 56 | .153 |
| 57 | 0 09.338 | 0 19.168 | 0 28.997 | 0 38.827 | 0 48.656 | 0 58.486 | 1 08.315 | 1 18.145 | 57 | .156 |
| 58 | 0 09.502 | 0 19.331 | 0 29.161 | 0 38.991 | 0 48.820 | 0 58.650 | 1 08.479 | 1 18.309 | 58 | .158 |
| 59 | 0 09.666 | 0 19.495 | 0 29.325 | 0 39.154 | 0 48.984 | 0 58.814 | 1 08.643 | 1 18.473 | 59 | .161 |

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

| Sidereal | 8 h. | 9 h. | 10 h. | 11 h. | 12 h. | 13 h. | 14 h. | 15 h. | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 1 18.636 | 1 28.466 | 1 38.296 | 1 48.125 | 1 57.955 | 2 07.784 | 2 17.614 | 2 27.443 | | |
| 1 | 1 18.800 | 1 28.630 | 1 38.459 | 1 48.289 | 1 58.119 | 2 07.948 | 2 17.778 | 2 27.607 | 1 | 0.003 |
| 2 | 1 18.964 | 1 28.794 | 1 38.623 | 1 48.453 | 1 58.282 | 2 08.112 | 2 17.941 | 2 27.771 | 2 | .005 |
| 3 | 1 19.128 | 1 28.958 | 1 38.787 | 1 48.617 | 1 58.446 | 2 08.276 | 2 18.105 | 2 27.935 | 3 | .008 |
| 4 | 1 19.292 | 1 29.121 | 1 38.951 | 1 48.780 | 1 58.610 | 2 08.440 | 2 18.269 | 2 28.099 | 4 | .011 |
| 5 | 1 19.456 | 1 29.285 | 1 39.115 | 1 48.944 | 1 58.774 | 2 08.603 | 2 18.433 | 2 28.263 | 5 | .014 |
| 6 | 1 19.619 | 1 29.449 | 1 39.279 | 1 49.108 | 1 58.938 | 2 08.767 | 2 18.597 | 2 28.426 | 6 | .016 |
| 7 | 1 19.783 | 1 29.613 | 1 39.442 | 1 49.272 | 1 59.101 | 2 08.931 | 2 18.761 | 2 28.590 | 7 | .019 |
| 8 | 1 19.947 | 1 29.777 | 1 39.606 | 1 49.436 | 1 59.265 | 2 09.095 | 2 18.924 | 2 28.754 | 8 | .022 |
| 9 | 1 20.111 | 1 29.940 | 1 39.770 | 1 49.600 | 1 59.429 | 2 09.259 | 2 19.088 | 2 28.918 | 9 | .025 |
| 10 | 1 20.275 | 1 30.104 | 1 39.934 | 1 49.763 | 1 59.593 | 2 09.423 | 2 19.252 | 2 29.082 | 10 | .027 |
| 11 | 1 20.439 | 1 30.268 | 1 40.098 | 1 49.927 | 1 59.757 | 2 09.586 | 2 19.416 | 2 29.245 | 11 | .030 |
| 12 | 1 20.602 | 1 30.432 | 1 40.261 | 1 50.091 | 1 59.921 | 2 09.750 | 2 19.580 | 2 29.409 | 12 | .033 |
| 13 | 1 20.766 | 1 30.596 | 1 40.425 | 1 50.255 | 2 00.084 | 2 09.914 | 2 19.744 | 2 29.573 | 13 | .035 |
| 14 | 1 20.930 | 1 30.760 | 1 40.589 | 1 50.419 | 2 00.248 | 2 10.078 | 2 19.907 | 2 29.737 | 14 | .038 |
| 15 | 1 21.094 | 1 30.923 | 1 40.753 | 1 50.583 | 2 00.412 | 2 10.242 | 2 20.071 | 2 29.901 | 15 | .041 |
| 16 | 1 21.258 | 1 31.087 | 1 40.917 | 1 50.746 | 2 00.576 | 2 10.405 | 2 20.285 | 2 30.065 | 16 | .044 |
| 17 | 1 21.422 | 1 31.251 | 1 41.081 | 1 50.910 | 2 00.740 | 2 10.569 | 2 20.399 | 2 30.228 | 17 | .046 |
| 18 | 1 21.585 | 1 31.415 | 1 41.244 | 1 51.074 | 2 00.904 | 2 10.733 | 2 20.563 | 2 30.392 | 18 | .049 |
| 19 | 1 21.749 | 1 31.579 | 1 41.408 | 1 51.238 | 2 01.067 | 2 10.897 | 2 20.727 | 2 30.556 | 19 | .052 |
| 20 | 1 21.913 | 1 31.743 | 1 41.572 | 1 51.402 | 2 01.231 | 2 11.061 | 2 20.890 | 2 30.720 | 20 | .055 |
| 21 | 1 22.077 | 1 31.906 | 1 41.736 | 1 51.565 | 2 01.395 | 2 11.225 | 2 21.054 | 2 30.884 | 21 | .057 |
| 22 | 1 22.241 | 1 32.070 | 1 41.900 | 1 51.729 | 2 01.559 | 2 11.388 | 2 21.218 | 2 31.048 | 22 | .060 |
| 23 | 1 22.404 | 1 32.234 | 1 42.064 | 1 51.893 | 2 01.723 | 2 11.552 | 2 21.382 | 2 31.211 | 23 | .063 |
| 24 | 1 22.568 | 1 32.398 | 1 42.227 | 1 52.057 | 2 01.887 | 2 11.716 | 2 21.546 | 2 31.375 | 24 | .066 |
| 25 | 1 22.732 | 1 32.562 | 1 42.391 | 1 52.221 | 2 02.050 | 2 11.880 | 2 21.709 | 2 31.539 | 25 | .068 |
| 26 | 1 22.896 | 1 32.726 | 1 42.555 | 1 52.385 | 2 02.214 | 2 12.044 | 2 21.873 | 2 31.703 | 26 | .071 |
| 27 | 1 23.060 | 1 32.889 | 1 42.719 | 1 52.548 | 2 02.378 | 2 12.208 | 2 22.037 | 2 31.867 | 27 | .074 |
| 28 | 1 23.224 | 1 33.053 | 1 42.883 | 1 52.712 | 2 02.542 | 2 12.371 | 2 22.201 | 2 32.031 | 28 | .076 |
| 29 | 1 23.387 | 1 33.217 | 1 43.047 | 1 52.876 | 2 02.706 | 2 12.535 | 2 22.365 | 2 32.194 | 29 | .079 |
| 30 | 1 23.551 | 1 33.381 | 1 43.210 | 1 53.040 | 2 02.869 | 2 12.699 | 2 22.529 | 2 32.358 | 30 | .082 |
| 31 | 1 23.715 | 1 33.545 | 1 43.374 | 1 53.204 | 2 03.033 | 2 12.863 | 2 22.692 | 2 32.522 | 31 | .085 |
| 32 | 1 23.879 | 1 33.708 | 1 43.538 | 1 53.368 | 2 03.197 | 2 13.027 | 2 22.856 | 2 32.686 | 32 | .087 |
| 33 | 1 24.043 | 1 33.872 | 1 43.702 | 1 53.531 | 2 03.361 | 2 13.191 | 2 23.020 | 2 32.850 | 33 | .090 |
| 34 | 1 24.207 | 1 34.036 | 1 43.866 | 1 53.695 | 2 03.525 | 2 13.354 | 2 23.184 | 2 33.013 | 34 | .093 |
| 35 | 1 24.370 | 1 34.200 | 1 44.029 | 1 53.859 | 2 03.689 | 2 13.518 | 2 23.348 | 2 33.177 | 35 | .096 |
| 36 | 1 24.534 | 1 34.364 | 1 44.193 | 1 54.023 | 2 03.852 | 2 13.682 | 2 23.512 | 2 33.341 | 36 | .098 |
| 37 | 1 24.698 | 1 34.528 | 1 44.357 | 1 54.187 | 2 04.016 | 2 13.846 | 2 23.675 | 2 33.505 | 37 | .101 |
| 38 | 1 24.862 | 1 34.691 | 1 44.521 | 1 54.351 | 2 04.180 | 2 14.010 | 2 23.839 | 2 33.669 | 38 | .104 |
| 39 | 1 25.026 | 1 34.855 | 1 44.685 | 1 54.514 | 2 04.344 | 2 14.173 | 2 24.003 | 2 33.833 | 39 | .106 |
| 40 | 1 25.190 | 1 35.019 | 1 44.849 | 1 54.678 | 2 04.508 | 2 14.337 | 2 24.167 | 2 33.996 | 40 | .109 |
| 41 | 1 25.353 | 1 35.183 | 1 45.012 | 1 54.842 | 2 04.672 | 2 14.501 | 2 24.331 | 2 34.160 | 41 | .112 |
| 42 | 1 25.517 | 1 35.347 | 1 45.176 | 1 55.006 | 2 04.835 | 2 14.665 | 2 24.495 | 2 34.324 | 42 | .115 |
| 43 | 1 25.681 | 1 35.511 | 1 45.340 | 1 55.170 | 2 04.999 | 2 14.829 | 2 24.658 | 2 34.488 | 43 | .117 |
| 44 | 1 25.845 | 1 35.674 | 1 45.504 | 1 55.333 | 2 05.163 | 2 14.993 | 2 24.822 | 2 34.652 | 44 | .120 |
| 45 | 1 26.009 | 1 35.838 | 1 45.668 | 1 55.497 | 2 05.327 | 2 15.156 | 2 24.986 | 2 34.816 | 45 | .123 |
| 46 | 1 26.172 | 1 36.002 | 1 45.832 | 1 55.661 | 2 05.491 | 2 15.320 | 2 25.150 | 2 34.979 | 46 | .126 |
| 47 | 1 26.336 | 1 36.166 | 1 45.995 | 1 55.825 | 2 05.655 | 2 15.484 | 2 25.314 | 2 35.143 | 47 | .128 |
| 48 | 1 26.500 | 1 36.330 | 1 46.159 | 1 55.989 | 2 05.818 | 2 15.648 | 2 25.477 | 2 35.307 | 48 | .131 |
| 49 | 1 26.664 | 1 36.493 | 1 46.323 | 1 56.153 | 2 05.982 | 2 15.812 | 2 25.641 | 2 35.471 | 49 | .134 |
| 50 | 1 26.828 | 1 36.657 | 1 46.487 | 1 56.316 | 2 06.146 | 2 15.976 | 2 25.805 | 2 35.635 | 50 | .137 |
| 51 | 1 26.992 | 1 36.821 | 1 46.651 | 1 56.480 | 2 06.310 | 2 16.139 | 2 25.969 | 2 35.798 | 51 | .139 |
| 52 | 1 27.155 | 1 36.985 | 1 46.815 | 1 56.644 | 2 06.474 | 2 16.303 | 2 26.133 | 2 35.962 | 52 | .142 |
| 53 | 1 27.319 | 1 37.149 | 1 46.978 | 1 56.808 | 2 06.637 | 2 16.467 | 2 26.297 | 2 36.126 | 53 | .145 |
| 54 | 1 27.483 | 1 37.313 | 1 47.142 | 1 56.972 | 2 06.801 | 2 16.631 | 2 26.460 | 2 36.290 | 54 | .147 |
| 55 | 1 27.647 | 1 37.476 | 1 47.306 | 1 57.136 | 2 06.965 | 2 16.795 | 2 26.624 | 2 36.454 | 55 | .150 |
| 56 | 1 27.811 | 1 37.640 | 1 47.470 | 1 57.299 | 2 07.129 | 2 16.959 | 2 26.788 | 2 36.618 | 56 | .153 |
| 57 | 1 27.975 | 1 37.804 | 1 47.634 | 1 57.463 | 2 07.293 | 2 17.122 | 2 26.952 | 2 36.781 | 57 | .156 |
| 58 | 1 28.138 | 1 37.968 | 1 47.797 | 1 57.627 | 2 07.457 | 2 17.286 | 2 27.116 | 2 36.945 | 58 | .158 |
| 59 | 1 28.302 | 1 38.132 | 1 47.961 | 1 57.791 | 2 07.620 | 2 17.450 | 2 27.280 | 2 37.109 | 59 | .161 |

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

| Sidereal. | $16^{h.}$ | $17^{h.}$ | $18^{h.}$ | $19^{h.}$ | $20^{h.}$ | $21^{h.}$ | $22^{h.}$ | $23^{h.}$ | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 2 37.273 | 2 47.102 | 2 56.932 | 3 06.762 | 3 16.591 | 3 26.421 | 3 36.250 | 3 46.080 | | |
| 1 | 2 37.437 | 2 47.266 | 2 57.096 | 3 06.925 | 3 16.755 | 3 26.585 | 3 36.414 | 3 46.244 | 1 | 0.003 |
| 2 | 2 37.601 | 2 47.430 | 2 57.260 | 3 07.089 | 3 16.919 | 3 26.748 | 3 36.578 | 3 46.407 | 2 | .005 |
| 3 | 2 37.764 | 2 47.594 | 2 57.424 | 3 07.253 | 3 17.083 | 3 26.912 | 3 36.742 | 3 46.571 | 3 | .008 |
| 4 | 2 37.928 | 2 47.758 | 2 57.587 | 3 07.417 | 3 17.246 | 3 27.076 | 3 36.906 | 3 46.735 | 4 | .011 |
| 5 | 2 38.092 | 2 47.922 | 2 57.751 | 3 07.581 | 3 17.410 | 3 27.240 | 3 37.069 | 3 46.899 | 5 | .014 |
| 6 | 2 38.256 | 2 48.085 | 2 57.915 | 3 07.745 | 3 17.574 | 3 27.404 | 3 37.233 | 3 47.063 | 6 | .016 |
| 7 | 2 38.420 | 2 48.249 | 2 58.079 | 3 07.908 | 3 17.738 | 3 27.568 | 3 37.397 | 3 47.227 | 7 | .019 |
| 8 | 2 38.584 | 2 48.413 | 2 58.243 | 3 08.072 | 3 17.902 | 3 27.731 | 3 37.561 | 3 47.390 | 8 | .022 |
| 9 | 2 38.747 | 2 48.577 | 2 58.406 | 3 08.236 | 3 18.066 | 3 27.895 | 3 37.725 | 3 47.554 | 9 | .025 |
| 10 | 2 38.911 | 2 48.741 | 2 58.570 | 3 08.400 | 3 18.229 | 3 28.059 | 3 37.889 | 3 47.718 | 10 | .027 |
| 11 | 2 39.075 | 2 48.905 | 2 58.734 | 3 08.564 | 3 18.393 | 3 28.223 | 3 38.052 | 3 47.882 | 11 | .030 |
| 12 | 2 39.239 | 2 49.068 | 2 58.898 | 3 08.728 | 3 18.557 | 3 28.387 | 3 38.216 | 3 48.046 | 12 | .033 |
| 13 | 2 39.403 | 2 49.232 | 2 59.062 | 3 08.891 | 3 18.721 | 3 28.550 | 3 38.380 | 3 48.210 | 13 | .035 |
| 14 | 2 39.566 | 2 49.396 | 2 59.226 | 3 09.055 | 3 18.885 | 3 28.714 | 3 38.544 | 3 48.373 | 14 | .038 |
| 15 | 2 39.730 | 2 49.560 | 2 59.389 | 3 09.219 | 3 19.049 | 3 28.878 | 3 38.708 | 3 48.537 | 15 | .041 |
| 16 | 2 39.894 | 2 49.724 | 2 59.553 | 3 09.383 | 3 19.212 | 3 29.042 | 3 38.871 | 3 48.701 | 16 | .044 |
| 17 | 2 40.058 | 2 49.888 | 2 59.717 | 3 09.547 | 3 19.376 | 3 29.206 | 3 39.035 | 3 48.865 | 17 | .046 |
| 18 | 2 40.222 | 2 50.051 | 2 59.881 | 3 09.710 | 3 19.540 | 3 29.370 | 3 39.199 | 3 49.029 | 18 | .049 |
| 19 | 2 40.386 | 2 50.215 | 3 00.045 | 3 09.874 | 3 19.704 | 3 29.533 | 3 39.363 | 3 49.193 | 19 | .052 |
| 20 | 2 40.549 | 2 50.379 | 3 00.209 | 3 10.038 | 3 19.868 | 3 29.697 | 3 39.527 | 3 49.356 | 20 | .055 |
| 21 | 2 40.713 | 2 50.543 | 3 00.372 | 3 10.202 | 3 20.032 | 3 29.861 | 3 39.691 | 3 49.520 | 21 | .057 |
| 22 | 2 40.877 | 2 50.707 | 3 00.536 | 3 10.366 | 3 20.195 | 3 30.025 | 3 39.854 | 3 49.684 | 22 | .060 |
| 23 | 2 41.041 | 2 50.870 | 3 00.700 | 3 10.530 | 3 20.359 | 3 30.189 | 3 40.018 | 3 49.848 | 23 | .063 |
| 24 | 2 41.205 | 2 51.034 | 3 00.864 | 3 10.693 | 3 20.523 | 3 30.353 | 3 40.182 | 3 50.012 | 24 | .066 |
| 25 | 2 41.369 | 2 51.198 | 3 01.028 | 3 10.857 | 3 20.687 | 3 30.516 | 3 40.346 | 3 50.175 | 25 | .068 |
| 26 | 2 41.532 | 2 51.362 | 3 01.192 | 3 11.021 | 3 20.851 | 3 30.680 | 3 40.510 | 3 50.339 | 26 | .071 |
| 27 | 2 41.696 | 2 51.526 | 3 01.355 | 3 11.185 | 3 21.014 | 3 30.844 | 3 40.674 | 3 50.503 | 27 | .074 |
| 28 | 2 41.860 | 2 51.690 | 3 01.519 | 3 11.349 | 3 21.178 | 3 31.008 | 3 40.837 | 3 50.667 | 28 | .076 |
| 29 | 2 42.024 | 2 51.853 | 3 01.683 | 3 11.513 | 3 21.342 | 3 31.172 | 3 41.001 | 3 50.831 | 29 | .079 |
| 30 | 2 42.188 | 2 52.017 | 3 01.847 | 3 11.676 | 3 21.506 | 3 31.336 | 3 41.165 | 3 50.995 | 30 | .082 |
| 31 | 2 42.352 | 2 52.181 | 3 02.011 | 3 11.840 | 3 21.670 | 3 31.499 | 3 41.329 | 3 51.158 | 31 | .085 |
| 32 | 2 42.515 | 2 52.345 | 3 02.174 | 3 12.004 | 3 21.834 | 3 31.663 | 3 41.493 | 3 51.322 | 32 | .087 |
| 33 | 2 42.679 | 2 52.509 | 3 02.338 | 3 12.168 | 3 21.997 | 3 31.827 | 3 41.657 | 3 51.486 | 33 | .090 |
| 34 | 2 42.843 | 2 52.673 | 3 02.502 | 3 12.332 | 3 22.161 | 3 31.991 | 3 41.820 | 3 51.650 | 34 | .093 |
| 35 | 2 43.007 | 2 52.836 | 3 02.666 | 3 12.496 | 3 22.325 | 3 32.155 | 3 41.984 | 3 51.814 | 35 | .096 |
| 36 | 2 43.171 | 2 53.000 | 3 02.830 | 3 12.659 | 3 22.489 | 3 32.318 | 3 42.148 | 3 51.978 | 36 | .098 |
| 37 | 2 43.334 | 2 53.164 | 3 02.994 | 3 12.823 | 3 22.653 | 3 32.482 | 3 42.312 | 3 52.141 | 37 | .101 |
| 38 | 2 43.498 | 2 53.328 | 3 03.157 | 3 12.987 | 3 22.817 | 3 32.646 | 3 42.476 | 3 52.305 | 38 | .104 |
| 39 | 2 43.662 | 2 53.492 | 3 03.321 | 3 13.151 | 3 22.980 | 3 32.810 | 3 42.639 | 3 52.469 | 39 | .106 |
| 40 | 2 43.826 | 2 53.656 | 3 03.485 | 3 13.315 | 3 23.144 | 3 32.974 | 3 42.803 | 3 52.633 | 40 | .109 |
| 41 | 2 43.990 | 2 53.819 | 3 03.649 | 3 13.478 | 3 23.308 | 3 33.138 | 3 42.967 | 3 52.797 | 41 | .112 |
| 42 | 2 44.154 | 2 53.983 | 3 03.813 | 3 13.642 | 3 23.472 | 3 33.301 | 3 43.131 | 3 52.961 | 42 | .115 |
| 43 | 2 44.317 | 2 54.147 | 3 03.977 | 3 13.806 | 3 23.636 | 3 33.465 | 3 43.295 | 3 53.124 | 43 | .117 |
| 44 | 2 44.481 | 2 54.311 | 3 04.140 | 3 13.970 | 3 23.800 | 3 33.629 | 3 43.459 | 3 53.288 | 44 | .120 |
| 45 | 2 44.645 | 2 54.475 | 3 04.304 | 3 14.134 | 3 23.963 | 3 33.793 | 3 43.622 | 3 53.452 | 45 | .123 |
| 46 | 2 44.809 | 2 54.638 | 3 04.468 | 3 14.298 | 3 24.127 | 3 33.957 | 3 43.786 | 3 53.616 | 46 | .126 |
| 47 | 2 44.973 | 2 54.802 | 3 04.632 | 3 14.461 | 3 24.291 | 3 34.121 | 3 43.950 | 3 53.780 | 47 | .128 |
| 48 | 2 45.137 | 2 54.966 | 3 04.796 | 3 14.625 | 3 24.455 | 3 34.284 | 3 44.114 | 3 53.943 | 48 | .131 |
| 49 | 2 45.300 | 2 55.130 | 3 04.960 | 3 14.789 | 3 24.619 | 3 34.448 | 3 44.278 | 3 54.107 | 49 | .134 |
| 50 | 2 45.464 | 2 55.294 | 3 05.123 | 3 14.953 | 3 24.782 | 3 34.612 | 3 44.442 | 3 54.271 | 50 | .137 |
| 51 | 2 45.628 | 2 55.458 | 3 05.287 | 3 15.117 | 3 24.946 | 3 34.776 | 3 44.605 | 3 54.435 | 51 | .139 |
| 52 | 2 45.792 | 2 55.621 | 3 05.451 | 3 15.281 | 3 25.110 | 3 34.940 | 3 44.769 | 3 54.599 | 52 | .142 |
| 53 | 2 45.956 | 2 55.785 | 3 05.615 | 3 15.444 | 3 25.274 | 3 35.104 | 3 44.933 | 3 54.763 | 53 | .145 |
| 54 | 2 46.120 | 2 55.949 | 3 05.779 | 3 15.608 | 3 25.438 | 3 35.267 | 3 45.097 | 3 54.926 | 54 | .147 |
| 55 | 2 46.283 | 2 56.113 | 3 05.942 | 3 15.772 | 3 25.602 | 3 35.431 | 3 45.261 | 3 55.090 | 55 | .150 |
| 56 | 2 46.447 | 2 56.277 | 3 06.106 | 3 15.936 | 3 25.765 | 3 35.595 | 3 45.425 | 3 55.254 | 56 | .153 |
| 57 | 2 46.611 | 2 56.441 | 3 06.270 | 3 16.100 | 3 25.929 | 3 35.759 | 3 45.588 | 3 55.418 | 57 | .156 |
| 58 | 2 46.775 | 2 56.604 | 3 06.434 | 3 16.264 | 3 26.093 | 3 35.923 | 3 45.752 | 3 55.582 | 58 | .158 |
| 59 | 2 46.939 | 2 56.768 | 3 06.598 | 3 16.427 | 3 26.257 | 3 36.086 | 3 45.916 | 3 55.746 | 59 | .161 |

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

| Mean Solar. | $0^{\text{h.}}$ | $1^{\text{h.}}$ | $2^{\text{h.}}$ | $3^{\text{h.}}$ | $4^{\text{h.}}$ | $5^{\text{h.}}$ | $6^{\text{h.}}$ | $7^{\text{h.}}$ | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 0 00.000 | 0 09.856 | 0 19.713 | 0 29.569 | 0 39.426 | 0 49.282 | 0 59.139 | 1 08.995 | | |
| 1 | 0 00.164 | 0 10.021 | 0 19.877 | 0 29.734 | 0 39.590 | 0 49.447 | 0 59.303 | 1 09.160 | 1 | 0.003 |
| 2 | 0 00.329 | 0 10.185 | 0 20.041 | 0 29.898 | 0 39.754 | 0 49.611 | 0 59.467 | 1 09.324 | 2 | .005 |
| 3 | 0 00.493 | 0 10.349 | 0 20.206 | 0 30.062 | 0 39.919 | 0 49.775 | 0 59.632 | 1 09.488 | 3 | .008 |
| 4 | 0 00.657 | 0 10.514 | 0 20.370 | 0 30.227 | 0 40.083 | 0 49.939 | 0 59.796 | 1 09.652 | 4 | .011 |
| 5 | 0 00.821 | 0 10.678 | 0 20.534 | 0 30.391 | 0 40.247 | 0 50.104 | 0 59.960 | 1 09.817 | 5 | .014 |
| 6 | 0 00.986 | 0 10.842 | 0 20.699 | 0 30.555 | 0 40.412 | 0 50.268 | 1 00.124 | 1 09.981 | 6 | .016 |
| 7 | 0 01.150 | 0 11.006 | 0 20.863 | 0 30.719 | 0 40.576 | 0 50.432 | 1 00.289 | 1 10.145 | 7 | .019 |
| 8 | 0 01.314 | 0 11.171 | 0 21.027 | 0 30.884 | 0 40.740 | 0 50.597 | 1 00.453 | 1 10.310 | 8 | .022 |
| 9 | 0 01.478 | 0 11.335 | 0 21.191 | 0 31.048 | 0 40.904 | 0 50.761 | 1 00.617 | 1 10.474 | 9 | .025 |
| 10 | 0 01.643 | 0 11.499 | 0 21.356 | 0 31.212 | 0 41.069 | 0 50.925 | 1 00.782 | 1 10.638 | 10 | .027 |
| 11 | 0 01.807 | 0 11.663 | 0 21.520 | 0 31.376 | 0 41.233 | 0 51.089 | 1 00.946 | 1 10.802 | 11 | .030 |
| 12 | 0 01.971 | 0 11.828 | 0 21.684 | 0 31.541 | 0 41.397 | 0 51.254 | 1 01.110 | 1 10.967 | 12 | .033 |
| 13 | 0 02.136 | 0 11.992 | 0 21.849 | 0 31.705 | 0 41.561 | 0 51.418 | 1 01.274 | 1 11.131 | 13 | .036 |
| 14 | 0 02.300 | 0 12.156 | 0 22.013 | 0 31.869 | 0 41.726 | 0 51.582 | 1 01.439 | 1 11.295 | 14 | .038 |
| 15 | 0 02.464 | 0 12.321 | 0 22.177 | 0 32.034 | 0 41.890 | 0 51.746 | 1 01.603 | 1 11.459 | 15 | .041 |
| 16 | 0 02.628 | 0 12.485 | 0 22.341 | 0 32.198 | 0 42.054 | 0 51.911 | 1 01.767 | 1 11.624 | 16 | .044 |
| 17 | 0 02.793 | 0 12.649 | 0 22.506 | 0 32.362 | 0 42.219 | 0 52.075 | 1 01.932 | 1 11.788 | 17 | .047 |
| 18 | 0 02.957 | 0 12.813 | 0 22.670 | 0 32.526 | 0 42.383 | 0 52.239 | 1 02.096 | 1 11.952 | 18 | .049 |
| 19 | 0 03.121 | 0 12.978 | 0 22.834 | 0 32.691 | 0 42.547 | 0 52.404 | 1 02.260 | 1 12.117 | 19 | .052 |
| 20 | 0 03.285 | 0 13.142 | 0 22.998 | 0 32.855 | 0 42.711 | 0 52.568 | 1 02.424 | 1 12.281 | 20 | .055 |
| 21 | 0 03.450 | 0 13.306 | 0 23.163 | 0 33.019 | 0 42.876 | 0 52.732 | 1 02.589 | 1 12.445 | 21 | .057 |
| 22 | 0 03.614 | 0 13.471 | 0 23.327 | 0 33.183 | 0 43.040 | 0 52.896 | 1 02.753 | 1 12.609 | 22 | .060 |
| 23 | 0 03.778 | 0 13.635 | 0 23.491 | 0 33.348 | 0 43.204 | 0 53.061 | 1 02.917 | 1 12.774 | 23 | .063 |
| 24 | 0 03.943 | 0 13.799 | 0 23.656 | 0 33.512 | 0 43.368 | 0 53.225 | 1 03.081 | 1 12.938 | 24 | .066 |
| 25 | 0 04.107 | 0 13.963 | 0 23.820 | 0 33.676 | 0 43.533 | 0 53.389 | 1 03.246 | 1 13.102 | 25 | .068 |
| 26 | 0 04.271 | 0 14.128 | 0 23.984 | 0 33.841 | 0 43.697 | 0 53.554 | 1 03.410 | 1 13.266 | 26 | .071 |
| 27 | 0 04.435 | 0 14.292 | 0 24.148 | 0 34.005 | 0 43.861 | 0 53.718 | 1 03.574 | 1 13.431 | 27 | .074 |
| 28 | 0 04.600 | 0 14.456 | 0 24.313 | 0 34.169 | 0 44.026 | 0 53.882 | 1 03.739 | 1 13.595 | 28 | .077 |
| 29 | 0 04.764 | 0 14.620 | 0 24.477 | 0 34.333 | 0 44.190 | 0 54.046 | 1 03.903 | 1 13.759 | 29 | .079 |
| 30 | 0 04.928 | 0 14.785 | 0 24.641 | 0 34.498 | 0 44.354 | 0 54.211 | 1 04.067 | 1 13.924 | 30 | .082 |
| 31 | 0 05.093 | 0 14.949 | 0 24.805 | 0 34.662 | 0 44.518 | 0 54.375 | 1 04.231 | 1 14.088 | 31 | .085 |
| 32 | 0 05.257 | 0 15.113 | 0 24.970 | 0 34.826 | 0 44.683 | 0 54.539 | 1 04.396 | 1 14.252 | 32 | .088 |
| 33 | 0 05.421 | 0 15.278 | 0 25.134 | 0 34.990 | 0 44.847 | 0 54.703 | 1 04.560 | 1 14.416 | 33 | .090 |
| 34 | 0 05.585 | 0 15.442 | 0 25.298 | 0 35.155 | 0 45.011 | 0 54.868 | 1 04.724 | 1 14.581 | 34 | .093 |
| 35 | 0 05.750 | 0 15.606 | 0 25.463 | 0 35.319 | 0 45.176 | 0 55.032 | 1 04.888 | 1 14.745 | 35 | .096 |
| 36 | 0 05.914 | 0 15.770 | 0 25.627 | 0 35.483 | 0 45.340 | 0 55.196 | 1 05.053 | 1 14.909 | 36 | .099 |
| 37 | 0 06.078 | 0 15.935 | 0 25.791 | 0 35.648 | 0 45.504 | 0 55.361 | 1 05.217 | 1 15.073 | 37 | .101 |
| 38 | 0 06.242 | 0 16.099 | 0 25.955 | 0 35.812 | 0 45.668 | 0 55.525 | 1 05.381 | 1 15.238 | 38 | .104 |
| 39 | 0 06.407 | 0 16.263 | 0 26.120 | 0 35.976 | 0 45.833 | 0 55.689 | 1 05.546 | 1 15.402 | 39 | .107 |
| 40 | 0 06.571 | 0 16.427 | 0 26.284 | 0 36.140 | 0 45.997 | 0 55.853 | 1 05.710 | 1 15.566 | 40 | .110 |
| 41 | 0 06.735 | 0 16.592 | 0 26.448 | 0 36.305 | 0 46.161 | 0 56.018 | 1 05.874 | 1 15.731 | 41 | .112 |
| 42 | 0 06.900 | 0 16.756 | 0 26.612 | 0 36.469 | 0 46.325 | 0 56.182 | 1 06.038 | 1 15.895 | 42 | .115 |
| 43 | 0 07.064 | 0 16.920 | 0 26.777 | 0 36.633 | 0 46.490 | 0 56.346 | 1 06.203 | 1 16.059 | 43 | .118 |
| 44 | 0 07.228 | 0 17.085 | 0 26.941 | 0 36.798 | 0 46.654 | 0 56.510 | 1 06.367 | 1 16.223 | 44 | .120 |
| 45 | 0 07.392 | 0 17.249 | 0 27.105 | 0 36.962 | 0 46.818 | 0 56.675 | 1 06.531 | 1 16.388 | 45 | .123 |
| 46 | 0 07.557 | 0 17.413 | 0 27.270 | 0 37.126 | 0 46.983 | 0 56.839 | 1 06.695 | 1 16.552 | 46 | .126 |
| 47 | 0 07.721 | 0 17.577 | 0 27.434 | 0 37.290 | 0 47.147 | 0 57.003 | 1 06.860 | 1 16.716 | 47 | .129 |
| 48 | 0 07.885 | 0 17.742 | 0 27.598 | 0 37.455 | 0 47.311 | 0 57.168 | 1 07.024 | 1 16.881 | 48 | .131 |
| 49 | 0 08.049 | 0 17.906 | 0 27.762 | 0 37.619 | 0 47.475 | 0 57.332 | 1 07.188 | 1 17.045 | 49 | .134 |
| 50 | 0 08.214 | 0 18.070 | 0 27.927 | 0 37.783 | 0 47.640 | 0 57.496 | 1 07.353 | 1 17.209 | 50 | .137 |
| 51 | 0 08.378 | 0 18.234 | 0 28.091 | 0 37.947 | 0 47.804 | 0 57.660 | 1 07.517 | 1 17.373 | 51 | .140 |
| 52 | 0 08.542 | 0 18.399 | 0 28.255 | 0 38.112 | 0 47.968 | 0 57.825 | 1 07.681 | 1 17.538 | 52 | .142 |
| 53 | 0 08.707 | 0 18.563 | 0 28.420 | 0 38.276 | 0 48.132 | 0 57.989 | 1 07.845 | 1 17.702 | 53 | .145 |
| 54 | 0 08.871 | 0 18.727 | 0 28.584 | 0 38.440 | 0 48.297 | 0 58.153 | 1 08.010 | 1 17.866 | 54 | .148 |
| 55 | 0 09.035 | 0 18.892 | 0 28.748 | 0 38.605 | 0 48.461 | 0 58.317 | 1 08.174 | 1 18.030 | 55 | .151 |
| 56 | 0 09.199 | 0 19.056 | 0 28.912 | 0 38.769 | 0 48.625 | 0 58.482 | 1 08.338 | 1 18.195 | 56 | .153 |
| 57 | 0 09.364 | 0 19.220 | 0 29.077 | 0 38.933 | 0 48.790 | 0 58.646 | 1 08.502 | 1 18.359 | 57 | .156 |
| 58 | 0 09.528 | 0 19.384 | 0 29.241 | 0 39.097 | 0 48.954 | 0 58.810 | 1 08.667 | 1 18.523 | 58 | 159 |
| 59 | 0 09.692 | 0 19.549 | 0 29.405 | 0 39.262 | 0 49.118 | 0 58.975 | 1 08.831 | 1 18.688 | 59 | .162 |

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

| Mean Solar. | 8h. | 9h. | 10h. | 11h. | 12h. | 13h. | 14h. | 15h. | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 1 18.852 | 1 28.708 | 1 38.565 | 1 48.421 | 1 58.278 | 2 08.134 | 2 17.991 | 2 27.847 | | |
| 1 | 1 19.016 | 1 28.873 | 1 38.729 | 1 48.585 | 1 58.442 | 2 08.298 | 2 18.155 | 2 28.011 | 1 | 0.003 |
| 2 | 1 19.180 | 1 29.037 | 1 38.893 | 1 48.750 | 1 58.606 | 2 08.463 | 2 18.319 | 2 28.176 | 2 | .005 |
| 3 | 1 19.345 | 1 29.201 | 1 39.058 | 1 48.914 | 1 58.771 | 2 08.627 | 2 18.483 | 2 28.340 | 3 | .008 |
| 4 | 1 19.509 | 1 29.365 | 1 39.222 | 1 49.078 | 1 58.935 | 2 08.791 | 2 18.648 | 2 28.504 | 4 | .011 |
| 5 | 1 19.673 | 1 29.530 | 1 39.386 | 1 49.243 | 1 59.099 | 2 08.956 | 2 18.812 | 2 28.668 | 5 | .014 |
| 6 | 1 19.837 | 1 29.694 | 1 39.550 | 1 49.407 | 1 59.263 | 2 09.120 | 2 18.976 | 2 28.833 | 6 | .016 |
| 7 | 1 20.002 | 1 29.858 | 1 39.715 | 1 49.571 | 1 59.428 | 2 09.284 | 2 19.141 | 2 28.997 | 7 | .019 |
| 8 | 1 20.166 | 1 30.022 | 1 39.879 | 1 49.735 | 1 59.592 | 2 09.448 | 2 19.305 | 2 29.161 | 8 | .022 |
| 9 | 1 20.330 | 1 30.187 | 1 40.043 | 1 49.900 | 1 59.756 | 2 09.613 | 2 19.469 | 2 29.326 | 9 | .025 |
| 10 | 1 20.495 | 1 30.351 | 1 40.207 | 1 50.064 | 1 59.920 | 2 09.777 | 2 19.633 | 2 29.490 | 10 | .027 |
| 11 | 1 20.659 | 1 30.515 | 1 40.372 | 1 50.228 | 2 00.085 | 2 09.941 | 2 19.798 | 2 29.654 | 11 | .030 |
| 12 | 1 20.823 | 1 30.680 | 1 40.536 | 1 50.393 | 2 00.249 | 2 10.105 | 2 19.962 | 2 29.818 | 12 | .033 |
| 13 | 1 20.987 | 1 30.844 | 1 40.700 | 1 50.557 | 2 00.413 | 2 10.270 | 2 20.126 | 2 29.983 | 13 | .036 |
| 14 | 1 21.152 | 1 31.008 | 1 40.865 | 1 50.721 | 2 00.578 | 2 10.434 | 2 20.290 | 2 30.147 | 14 | .038 |
| 15 | 1 21.316 | 1 31.172 | 1 41.029 | 1 50.885 | 2 00.742 | 2 10.598 | 2 20.455 | 2 30.311 | 15 | .041 |
| 16 | 1 21.480 | 1 31.337 | 1 41.193 | 1 51.050 | 2 00.906 | 2 10.763 | 2 20.619 | 2 30.476 | 16 | .044 |
| 17 | 1 21.644 | 1 31.501 | 1 41.357 | 1 51.214 | 2 01.070 | 2 10.927 | 2 20.783 | 2 30.640 | 17 | .047 |
| 18 | 1 21.809 | 1 31.665 | 1 41.522 | 1 51.378 | 2 01.235 | 2 11.091 | 2 20.948 | 2 30.804 | 18 | .049 |
| 19 | 1 21.973 | 1 31.829 | 1 41.686 | 1 51.542 | 2 01.399 | 2 11.255 | 2 21.112 | 2 30.968 | 19 | .052 |
| 20 | 1 22.137 | 1 31.994 | 1 41.850 | 1 51.707 | 2 01.563 | 2 11.420 | 2 21.276 | 2 31.133 | 20 | .055 |
| 21 | 1 22.302 | 1 32.158 | 1 42.015 | 1 51.871 | 2 01.727 | 2 11.584 | 2 21.440 | 2 31.297 | 21 | .057 |
| 22 | 1 22 466 | 1 32.322 | 1 42.179 | 1 52.035 | 2 01.892 | 2 11 748 | 2 21.605 | 2 31.461 | 22 | .060 |
| 23 | 1 22.630 | 1 32.487 | 1 42.343 | 1 52.200 | 2 02.056 | 2 11.912 | 2 21.769 | 2 31.625 | 23 | .063 |
| 24 | 1 22.794 | 1 32.651 | 1 42.507 | 1 52.364 | 2 02.220 | 2 12.077 | 2 21.933 | 2 31.790 | 24 | .066 |
| 25 | 1 22.959 | 1 32.815 | 1 42.672 | 1 52.528 | 2 02.385 | 2 12.241 | 2 22.098 | 2 31.954 | 25 | .068 |
| 26 | 1 23.123 | 1 32.979 | 1 42.836 | 1 52.692 | 2 02.549 | 2 12.405 | 2 22.262 | 2 32.118 | 26 | .071 |
| 27 | 1 23.287 | 1 33.144 | 1 43 000 | 1 52.857 | 2 02.713 | 2 12.570 | 2 22.426 | 2 32.283 | 27 | .074 |
| 28 | 1 23.451 | 1 33.308 | 1 43.164 | 1 53.021 | 2 02.877 | 2 12.734 | 2 22.590 | 2 32.447 | 28 | .077 |
| 29 | 1 23.616 | 1 33.472 | 1 43.329 | 1 53.185 | 2 03.042 | 2 12.898 | 2 22.755 | 2 32.611 | 29 | .079 |
| 30 | 1 23.780 | 1 33.637 | 1 43.493 | 1 53.349 | 2 03.206 | 2 13.062 | 2 22.919 | 2 32.775 | 30 | .082 |
| 31 | 1 23.944 | 1 33.801 | 1 43.657 | 1 53.514 | 2 03.370 | 2 13.227 | 2 23.083 | 2 32.940 | 31 | .085 |
| 32 | 1 24.109 | 1 33.965 | 1 43.822 | 1 53.678 | 2 03.534 | 2 13.391 | 2 23.247 | 2 33.104 | 32 | .088 |
| 33 | 1 24.273 | 1 34.129 | 1 43.986 | 1 53.842 | 2 03.699 | 2 13.555 | 2 23.412 | 2 33.268 | 33 | .090 |
| 34 | 1 24.437 | 1 34.294 | 1 44.150 | 1 54.007 | 2 03.863 | 2 13.720 | 2 23.576 | 2 33.432 | 34 | .093 |
| 35 | 1 24.601 | 1 34.458 | 1 44.314 | 1 54.171 | 2 04.027 | 2 13.884 | 2 23.740 | 2 33.597 | 35 | .096 |
| 36 | 1 24.766 | 1 34.622 | 1 44.479 | 1 54.335 | 2 04.192 | 2 14.048 | 2 23.905 | 2 33.761 | 36 | .099 |
| 37 | 1 24.930 | 1 34.786 | 1 44.643 | 1 54.499 | 2 04.356 | 2 14.212 | 2 24.069 | 2 33.925 | 37 | .101 |
| 38 | 1 25.094 | 1 34.951 | 1 44.807 | 1 54.664 | 2 04.520 | 2 14.377 | 2 24.233 | 2 34.090 | 38 | .104 |
| 39 | 1 25.259 | 1 35.115 | 1 44.971 | 1 54.828 | 2 04.684 | 2 14.541 | 2 24.397 | 2 34.254 | 39 | .107 |
| 40 | 1 25.423 | 1 35.279 | 1 45.136 | 1 54.992 | 2 04.849 | 2 14.705 | 2 24.562 | 2 34.418 | 40 | .110 |
| 41 | 1 25.587 | 1 35.444 | 1 45.300 | 1 55.156 | 2 05.013 | 2 14.869 | 2 24.726 | 2 34.582 | 41 | .112 |
| 42 | 1 25.751 | 1 35.608 | 1 45.464 | 1 55.321 | 2 05.177 | 2 15.034 | 2 24.890 | 2 34.747 | 42 | .115 |
| 43 | 1 25.916 | 1 35.772 | 1 45.629 | 1 55.485 | 2 05.342 | 2 15.198 | 2 25.054 | 2 34.911 | 43 | .118 |
| 44 | 1 26.080 | 1 35.936 | 1 45.793 | 1 55.649 | 2 05.506 | 2 15.362 | 2 25.219 | 2 35.075 | 44 | .120 |
| 45 | 1 26.244 | 1 36.101 | 1 45.957 | 1 55.814 | 2 05.670 | 2 15.527 | 2 25.383 | 2 35.239 | 45 | .123 |
| 46 | 1 26.408 | 1 36.265 | 1 46.121 | 1 55.978 | 2 05.834 | 2 15.691 | 2 25.547 | 2 35.404 | 46 | .126 |
| 47 | 1 26.573 | 1 36.429 | 1 46.286 | 1 56.142 | 2 05.999 | 2 15.855 | 2 25.712 | 2 35.568 | 47 | .129 |
| 48 | 1 26.737 | 1 36.593 | 1 46.450 | 1 56.306 | 2 06.163 | 2 16.019 | 2 25.876 | 2 35.732 | 48 | .131 |
| 49 | 1 26.901 | 1 36.758 | 1 46.614 | 1 56.471 | 2 06 327 | 2 16.184 | 2 26.040 | 2 35.897 | 49 | .134 |
| 50 | 1 27.066 | 1 36.922 | 1 46.778 | 1 56.635 | 2 06.491 | 2 16.348 | 2 26.204 | 2 36.061 | 50 | .137 |
| 51 | 1 27.230 | 1 37.086 | 1 46.943 | 1 56.799 | 2 06.656 | 2 16.512 | 2 26.369 | 2 36.225 | 51 | .140 |
| 52 | 1 27.394 | 1 37.251 | 1 47.107 | 1 56.964 | 2 06.820 | 2 16.676 | 2 26.533 | 2 36.389 | 52 | .142 |
| 53 | 1 27.558 | 1 37.415 | 1 47.271 | 1 57.128 | 2 06.984 | 2 16.841 | 2 26.697 | 2 36.554 | 53 | .145 |
| 54 | 1 27.723 | 1 37.579 | 1 47.436 | 1 57.292 | 2 07.149 | 2 17.005 | 2 26.861 | 2 36.718 | 54 | .148 |
| 55 | 1 27.887 | 1 37.743 | 1 47.600 | 1 57.456 | 2 07.313 | 2 17.169 | 2 27.026 | 2 36.882 | 55 | .151 |
| 56 | 1 28.051 | 1 37.908 | 1 47.764 | 1 57.621 | 2 07.477 | 2 17.334 | 2 27.190 | 2 37.047 | 56 | .153 |
| 57 | 1 28.215 | 1 38.072 | 1 47.928 | 1 57.785 | 2 07.641 | 2 17.498 | 2 27.354 | 2 37.211 | 57 | .156 |
| 58 | 1 28.380 | 1 38.236 | 1 48.093 | 1 57.949 | 2 07.806 | 2 17.662 | 2 27.519 | 2 37.375 | 58 | .159 |
| 59 | 1 28.544 | 1 38.400 | 1 48.257 | 1 58.113 | 2 07.970 | 2 17.826 | 2 27.683 | 2 37.539 | 59 | .162 |

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

| Mean Solar. | 16h. | 17h. | 18h. | 19h. | 20h. | 21h. | 22h. | 23h. | For Seconds. | |
|---|---|---|---|---|---|---|---|---|---|---|
| m. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | m. s. | s. | s. |
| 0 | 2 37.704 | 2 47.560 | 2 57.417 | 3 07.273 | 3 17.129 | 3 26.986 | 3 36.842 | 3 46.699 | | |
| 1 | 2 37.868 | 2 47.724 | 2 57.581 | 3 07.437 | 3 17.294 | 3 27.150 | 3 37.007 | 3 46.863 | 1 | 0.003 |
| 2 | 2 38.032 | 2 47.889 | 2 57.745 | 3 07.602 | 3 17.458 | 3 27.315 | 3 37.171 | 3 47.027 | 2 | .005 |
| 3 | 2 38.196 | 2 48.053 | 2 57.909 | 3 07.766 | 3 17.622 | 3 27.479 | 3 37.335 | 3 47.192 | 3 | .008 |
| 4 | 2 38.361 | 2 48.217 | 2 58.074 | 3 07.930 | 3 17.787 | 3 27.643 | 3 37.500 | 3 47.356 | 4 | .011 |
| 5 | 2 38.525 | 2 48.381 | 2 58.238 | 3 08.094 | 3 17.951 | 3 27.807 | 3 37.664 | 3 47.520 | 5 | .014 |
| 6 | 2 38.689 | 2 48.546 | 2 58.402 | 3 08.259 | 3 18.115 | 3 27.972 | 3 37.828 | 3 47.685 | 6 | .016 |
| 7 | 2 38.854 | 2 48.710 | 2 58.566 | 3 08.423 | 3 18.279 | 3 28.136 | 3 37.992 | 3 47.849 | 7 | .019 |
| 8 | 2 39.018 | 2 48.874 | 2 58.731 | 3 08.587 | 3 18.444 | 3 28.300 | 3 38.157 | 3 48.013 | 8 | .022 |
| 9 | 2 39.182 | 2 49.039 | 2 58.895 | 3 08.751 | 3 18.608 | 3 28.464 | 3 38.321 | 3 48.177 | 9 | .025 |
| 10 | 2 39.346 | 2 49.203 | 2 59.059 | 3 08.916 | 3 18.772 | 3 28.629 | 3 38.485 | 3 48.342 | 10 | .027 |
| 11 | 2 39.511 | 2 49.367 | 2 59.224 | 3 09.080 | 3 18.937 | 3 28.793 | 3 38.649 | 3 48.506 | 11 | .030 |
| 12 | 2 39.675 | 2 49.531 | 2 59.388 | 3 09.244 | 3 19.101 | 3 28.957 | 3 38.814 | 3 48.670 | 12 | .033 |
| 13 | 2 39.839 | 2 49.696 | 2 59.552 | 3 09.409 | 3 19.265 | 3 29.122 | 3 38.978 | 3 48.834 | 13 | .036 |
| 14 | 2 40.003 | 2 49.860 | 2 59.716 | 3 09.573 | 3 19.429 | 3 29.286 | 3 39.142 | 3 48.999 | 14 | .038 |
| 15 | 2 40.168 | 2 50.024 | 2 59.881 | 3 09.737 | 3 19.594 | 3 29.450 | 3 39.307 | 3 49.163 | 15 | .041 |
| 16 | 2 40.332 | 2 50.188 | 3 00.045 | 3 09.901 | 3 19.758 | 3 29.614 | 3 39.471 | 3 49.327 | 16 | .044 |
| 17 | 2 40.496 | 2 50.353 | 3 00.209 | 3 10.066 | 3 19.922 | 3 29.779 | 3 39.635 | 3 49.492 | 17 | .047 |
| 18 | 2 40.661 | 2 50.517 | 3 00.373 | 3 10.230 | 3 20.086 | 3 29.943 | 3 39.799 | 3 49.656 | 18 | .049 |
| 19 | 2 40.825 | 2 50.681 | 3 00.538 | 3 10.394 | 3 20.251 | 3 30.107 | 3 39.964 | 3 49.820 | 19 | .052 |
| 20 | 2 40.989 | 2 50.846 | 3 00.702 | 3 10.559 | 3 20.415 | 3 30.271 | 3 40.128 | 3 49.984 | 20 | .055 |
| 21 | 2 41.153 | 2 51.010 | 3 00.866 | 3 10.723 | 3 20.579 | 3 30.436 | 3 40.292 | 3 50.149 | 21 | .057 |
| 22 | 2 41.318 | 2 51.174 | 3 01.031 | 3 10.887 | 3 20.744 | 3 30.600 | 3 40.456 | 3 50.313 | 22 | .060 |
| 23 | 2 41.482 | 2 51.338 | 3 01.195 | 3 11.051 | 3 20.908 | 3 30.764 | 3 40.621 | 3 50.477 | 23 | .063 |
| 24 | 2 41.646 | 2 51.503 | 3 01.359 | 3 11.216 | 3 21.072 | 3 30.929 | 3 40.785 | 3 50.642 | 24 | .066 |
| 25 | 2 41.810 | 2 51.667 | 3 01.523 | 3 11.380 | 3 21.236 | 3 31.093 | 3 40.949 | 3 50.806 | 25 | .068 |
| 26 | 2 41.975 | 2 51.831 | 3 01.688 | 3 11.544 | 3 21.401 | 3 31.257 | 3 41.114 | 3 50.970 | 26 | .071 |
| 27 | 2 42.139 | 2 51.995 | 3 01.852 | 3 11.708 | 3 21.565 | 3 31.421 | 3 41.278 | 3 51.134 | 27 | .074 |
| 28 | 2 42.303 | 2 52.160 | 3 02.016 | 3 11.873 | 3 21.729 | 3 31.586 | 3 41.442 | 3 51.299 | 28 | .077 |
| 29 | 2 42.468 | 2 52.324 | 3 02.181 | 3 12.037 | 3 21.893 | 3 31.750 | 3 41.606 | 3 51.463 | 29 | .079 |
| 30 | 2 42.632 | 2 52.488 | 3 02.345 | 3 12.201 | 3 22.058 | 3 31.914 | 3 41.771 | 3 51.627 | 30 | .082 |
| 31 | 2 42.796 | 2 52.653 | 3 02.509 | 3 12.366 | 3 22.222 | 3 32.078 | 3 41.935 | 3 51.791 | 31 | .085 |
| 32 | 2 42.960 | 2 52.817 | 3 02.673 | 3 12.530 | 3 22.386 | 3 32.243 | 3 42.099 | 3 51.956 | 32 | .088 |
| 33 | 2 43.125 | 2 52.981 | 3 02.838 | 3 12.694 | 3 22.551 | 3 32.407 | 3 42.264 | 3 52.120 | 33 | .090 |
| 34 | 2 43.289 | 2 53.145 | 3 03.002 | 3 12.858 | 3 22.715 | 3 32.571 | 3 42.428 | 3 52.284 | 34 | .093 |
| 35 | 2 43.453 | 2 53.310 | 3 03.166 | 3 13.023 | 3 22.879 | 3 32.736 | 3 42.592 | 3 52.449 | 35 | .096 |
| 36 | 2 43.617 | 2 53.474 | 3 03.330 | 3 13.187 | 3 23.043 | 3 32.900 | 3 42.756 | 3 52.613 | 36 | .099 |
| 37 | 2 43.782 | 2 53.638 | 3 03.495 | 3 13.351 | 3 23.208 | 3 33.064 | 3 42.921 | 3 52.777 | 37 | .101 |
| 38 | 2 43.946 | 2 53.803 | 3 03.659 | 3 13.515 | 3 23.372 | 3 33.228 | 3 43.085 | 3 52.941 | 38 | .104 |
| 39 | 2 44.110 | 2 53.967 | 3 03.823 | 3 13.680 | 3 23.536 | 3 33.393 | 3 43.249 | 3 53.106 | 39 | .107 |
| 40 | 2 44.275 | 2 54.131 | 3 03.988 | 3 13.844 | 3 23.700 | 3 33.557 | 3 43.413 | 3 53.270 | 40 | .110 |
| 41 | 2 44.439 | 2 54.295 | 3 04.152 | 3 14.008 | 3 23.865 | 3 33.721 | 3 43.578 | 3 53.434 | 41 | .112 |
| 42 | 2 44.603 | 2 54.460 | 3 04.316 | 3 14.173 | 3 24.029 | 3 33.886 | 3 43.742 | 3 53.598 | 42 | .115 |
| 43 | 2 44.767 | 2 54.624 | 3 04.480 | 3 14.337 | 3 24.193 | 3 34.050 | 3 43.906 | 3 53.763 | 43 | .118 |
| 44 | 2 44.932 | 2 54.788 | 3 04.645 | 3 14.501 | 3 24.358 | 3 34.214 | 3 44.071 | 3 53.927 | 44 | .120 |
| 45 | 2 45.096 | 2 54.952 | 3 04.809 | 3 14.665 | 3 24.522 | 3 34.378 | 3 44.235 | 3 54.091 | 45 | .123 |
| 46 | 2 45.260 | 2 55.117 | 3 04.973 | 3 14.830 | 3 24.686 | 3 34.543 | 3 44.399 | 3 54.256 | 46 | .126 |
| 47 | 2 45.425 | 2 55.281 | 3 05.137 | 3 14.994 | 3 24.850 | 3 34.707 | 3 44.563 | 3 54.420 | 47 | .129 |
| 48 | 2 45.589 | 2 55.445 | 3 05.302 | 3 15.158 | 3 25.015 | 3 34.871 | 3 44.728 | 3 54.584 | 48 | .131 |
| 49 | 2 45.753 | 2 55.610 | 3 05.466 | 3 15.322 | 3 25.179 | 3 35.035 | 3 44.892 | 3 54.748 | 49 | .134 |
| 50 | 2 45.917 | 2 55.774 | 3 05.630 | 3 15.487 | 3 25.343 | 3 35.200 | 3 45.056 | 3 54.913 | 50 | .137 |
| 51 | 2 46.082 | 2 55.938 | 3 05.795 | 3 15.651 | 3 25.508 | 3 35.364 | 3 45.220 | 3 55.077 | 51 | .140 |
| 52 | 2 46.246 | 2 56.102 | 3 05.959 | 3 15.815 | 3 25.672 | 3 35.528 | 3 45.385 | 3 55.241 | 52 | .142 |
| 53 | 2 46.410 | 2 56.267 | 3 06.123 | 3 15.980 | 3 25.836 | 3 35.693 | 3 45.549 | 3 55.405 | 53 | .145 |
| 54 | 2 46.574 | 2 56.431 | 3 06.287 | 3 16.144 | 3 26.000 | 3 35.857 | 3 45.713 | 3 55.570 | 54 | .148 |
| 55 | 2 46.739 | 2 56.595 | 3 06.452 | 3 16.308 | 3 26.165 | 3 36.021 | 3 45.878 | 3 55.734 | 55 | .151 |
| 56 | 2 46.903 | 2 56.759 | 3 06.616 | 3 16.472 | 3 26.329 | 3 36.185 | 3 46.042 | 3 55.898 | 56 | .153 |
| 57 | 2 47.067 | 2 56.924 | 3 06.780 | 3 16.637 | 3 26.493 | 3 36.350 | 3 46.206 | 3 56.063 | 57 | .156 |
| 58 | 2 47.232 | 2 57.088 | 3 06.944 | 3 16.801 | 3 26.657 | 3 36.514 | 3 46.370 | 3 56 227 | 58 | 159 |
| 59 | 2 47.396 | 2 57.252 | 3 07.109 | 3 16.965 | 3 26.822 | 3 36.678 | 3 46.535 | 3 56.391 | 59 | .162 |

# EPHEMERIS OF NEPTUNE

FOR

# 1854.

71 61

# NEPTUNE 1854.

For Washington Sidereal Noon and Meridian Transit.

| Mean Solar Time of Meridian Transit. | | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log. of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| | d. | h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Jan. | 1 | 4 8.0 | 1 | 22 52 50.36 | 52 50.14 | – 8 10 33.4 | 10 34.8 | +7.537 | +8.341 | | |
| | 2 | 4 4.2 | 2 | 22 52 55.37 | 52 55.14 | 8 10 1.5 | 10 2.9 | 7.546 | 8.350 | | |
| | 3 | 4 0.3 | 3 | 22 53 0.49 | 53 0.26 | 8 9 28.9 | 9 30.4 | 7.555 | 8.359 | | |
| | 4 | 3 56.5 | 4 | 22 53 5.72 | 53 5.48 | 8 8 55.7 | 8 57.2 | 7 564 | 8 367 | | |
| | 5 | 3 52.6 | 5 | 22 53 11.04 | 53 10.80 | 8 8 21.5 | 8 23.4 | 7.573 | 8.375 | | |
| | 6 | 3 48.7 | 6 | 22 53 16.47 | 53 16.23 | 8 7 47.4 | 7 49.0 | 7 581 | 8.383 | | |
| | 7 | 3 44.9 | 7 | 22 53 22.00 | 53 21.76 | 8 7 12.4 | 7 14.0 | 7.589 | 8.390 | | |
| | 8 | 3 41.0 | 8 | 22 53 27.63 | 53 27.38 | 8 6 36.8 | 6 38.5 | 7.596 | 8.397 | | |
| | 9 | 3 37.2 | 9 | 22 53 33.36 | 53 33.10 | 8 6 0.6 | 6 2.4 | 7.603 | 8.404 | | |
| | 10 | 3 33.4 | 10 | 22 53 39.18 | 53 38.91 | 8 5 23.9 | 5 25.7 | 7.610 | 8.410 | | |
| | 11 | 3 29.6 | 11 | 22 53 45.10 | 53 44.82 | 8 4 46.6 | 4 48.4 | 7.617 | 8.416 | | |
| | 12 | 3 25.8 | 12 | 22 53 51.11 | 53 50.82 | 8 4 8.8 | 4 10.6 | 7.623 | 8.422 | | |
| | 13 | 3 21.9 | 13 | 22 53 57.21 | 53 56.92 | 8 3 30.5 | 3 32.3 | 7.630 | 8.428 | | |
| | 14 | 3 18.1 | 14 | 22 54 3.39 | 54 3.10 | 8 2 51.6 | 2 53.4 | 7.637 | 8.434 | | |
| | 15 | 3 14.2 | 15 | 22 54 9.66 | 54 9.37 | 8 2 12.2 | 2 14.0 | 7.643 | 8.440 | | |
| | 16 | 3 10.4 | 16 | 22 54 16.02 | 54 15.73 | 8 1 32.2 | 1 34.0 | 7.649 | 8.446 | | |
| | 17 | 3 6.6 | 17 | 22 54 22.47 | 54 22.18 | 8 0 51.7 | 0 53.5 | 7.655 | 8.452 | | |
| | 18 | 3 2.8 | 18 | 22 54 29.01 | 54 28.71 | 8 0 10.7 | 0 12.5 | 7.660 | 8.457 | | |
| | 19 | 2 59.0 | 19 | 22 54 35.63 | 54 35.32 | 7 59 29.2 | 59 31.1 | 7 665 | 8.462 | | |
| | 20 | 2 55.2 | 20 | 22 54 42.33 | 54 42.02 | 7 58 47.3 | 58 49.2 | 7.670 | 8.467 | | |
| | 21 | 2 51.3 | 21 | 22 54 49.11 | 54 48.80 | 7 58 4.9 | 58 6.8 | 7.675 | 8.472 | | |
| | 22 | 2 47.5 | 22 | 22 54 55.96 | 54 55.65 | 7 57 22.0 | 57 23.9 | 7.680 | 8.477 | | |
| | 23 | 2 43.7 | 23 | 22 55 2.89 | 55 2.58 | 7 56 38.7 | 56 40.6 | 7.685 | 8.481 | | |
| | 24 | 2 39.9 | 24 | 22 55 9.90 | 55 9.59 | 7 55 54.9 | 55 56.8 | 7.689 | 8.485 | | |
| | 25 | 2 36.1 | 25 | 22 55 16.99 | 55 16.67 | 7 55 10.7 | 55 12.6 | 7.694 | 8.489 | | |
| | 26 | 2 32.3 | 26 | 22 55 24.14 | 55 23.82 | 7 54 26.1 | 54 28.0 | 7.699 | 8.493 | | |
| | 27 | 2 28.5 | 27 | 22 55 31.36 | 55 31.04 | 7 53 41.1 | 53 43.0 | 7.703 | 8.497 | | |
| | 28 | 2 24.7 | 28 | 22 55 38.65 | 55 38.33 | 7 52 55.7 | 52 57.6 | 7.707 | 8.501 | | |
| | 29 | 2 20.9 | 29 | 22 55 46.01 | 55 45.69 | 7 52 9.9 | 52 11.8 | 7.711 | 8.505 | | |
| | 30 | 2 17.1 | 30 | 22 55 53.43 | 55 53.11 | 7 51 23.7 | 51 25.7 | 7.715 | 8.508 | | |
| | 31 | 2 13.3 | 31 | 22 56 0.92 | 56 0.59 | 7 50 37.1 | 50 39.2 | 7.718 | 8.511 | | |
| Feb. | 1 | 2 9.5 | 32 | 22 56 8.46 | 56 8.13 | 7 49 50.1 | 49 52.3 | 7.721 | 8.514 | | |
| | 2 | 2 5.7 | 33 | 22 56 16.06 | 56 15.73 | 7 49 2.8 | 49 5.1 | 7.724 | 8.517 | | |
| | 3 | 2 1.9 | 34 | 22 56 23.72 | 56 23.38 | 7 48 15.2 | 48 17.5 | 7.727 | 8.520 | | |
| | 4 | 1 58.1 | 35 | 22 56 31.43 | 56 31.09 | 7 47 27.3 | 47 29.6 | 7.730 | 8.523 | | |
| | 5 | 1 54.3 | 36 | 22 56 39.19 | 56 38.85 | 7 46 39.2 | 46 41.4 | 7.733 | 8.526 | | |
| | 6 | 1 50.5 | 37 | 22 56 47.01 | 56 46.66 | 7 45 50.8 | 45 53.0 | 7.736 | 8.529 | | |
| | 7 | 1 46.7 | 38 | 22 56 54.87 | 56 54.52 | 7 45 2.1 | 45 4.3 | 7 739 | 8.531 | | |
| | 8 | 1 42.9 | 39 | 22 57 2.78 | 57 2.43 | 7 44 13.1 | 44 15.3 | 7.741 | 8 533 | | |
| | 9 | 1 39.1 | 40 | 22 57 10.73 | 57 10.38 | 7 43 23.8 | 43 26.0 | 7.743 | 8.535 | | |
| | 10 | 1 35.3 | 41 | 22 57 18.73 | 57 18.38 | 7 42 34.3 | 42 36.5 | 7.746 | 8.537 | | |
| | 11 | 1 31.5 | 42 | 22 57 26.77 | 57 26.42 | 7 41 44.6 | 41 46.8 | 7.748 | 8.539 | | |
| | 12 | 1 27.7 | 43 | 22 57 34.85 | 57 34.50 | 7 40 54.6 | 40 56.8 | 7.750 | 8.541 | | |
| | 13 | 1 23.9 | 44 | 22 57 42.97 | 57 42.61 | 7 40 4.4 | 40 6.6 | 7.752 | 8.543 | | |
| | 14 | 1 20.1 | 45 | 22 57 51.13 | 57 50.76 | 7 39 14.0 | 39 16.2 | 7.754 | 8.545 | | |
| | 15 | 1 16.3 | 46 | 22 57 59.32 | 57 58.95 | 7 38 23.4 | 38 25.6 | 7 756 | 8.547 | | |
| | 16 | 1 12.5 | 47 | 22 58 7.54 | 58 7.17 | 7 37 32.6 | 37 34.8 | 7.758 | 8 548 | | |
| | 17 | 1 8.7 | 48 | 22 58 15.79 | 58 15.42 | 7 36 41.7 | 36 43.9 | 7 759 | 8.549 | | |
| | 18 | 1 4.9 | 49 | 22 58 24.07 | 58 23.70 | 7 35 50.6 | 35 52.8 | 7.761 | 8 550 | | |
| | 19 | 1 1.1 | 50 | 22 58 32.38 | 58 32.01 | 7 34 59.4 | 35 1.6 | 7.762 | 8.551 | | |
| | 20 | 0 57.3 | 51 | 22 58 40.71 | 58 40.35 | 7 34 8.0 | 34 10.3 | 7.763 | 8.552 | | |
| | 21 | 0 53.5 | 52 | 22 58 49.06 | 58 48.71 | 7 33 16.5 | 33 18.8 | 7.764 | 8.553 | | |
| | 22 | 0 49.7 | 53 | 22 58 57.44 | 58 57.08 | 7 32 25.0 | 32 27.2 | 7.765 | 8.554 | | |
| | 23 | 0 45.9 | 54 | 22 59 5.83 | 59 5.47 | 7 31 33.4 | 31 35.5 | 7.766 | 8.555 | | |
| | 24 | 0 42.1 | 55 | 22 59 14.24 | 59 13.88 | 7 30 41.6 | 30 43.7 | 7.767 | 8.556 | | |
| | 25 | 0 38.3 | 56 | 22 59 22.67 | 59 22.31 | 7 29 49.8 | 29 51.9 | 7 768 | 8.556 | | |
| | 26 | 0 34.5 | 57 | 22 59 31.11 | 59 30.75 | 7 28 57.9 | 29 0.0 | 7.768 | 8 556 | | |
| | 27 | 0 30.7 | 58 | 22 59 39.56 | 59 39.20 | 7 28 5.9 | 28 8.1 | 7.768 | 8.556 | | |
| | 28 | 0 26.9 | 59 | 22 59 48.02 | 59 47.66 | 7 27 13.9 | 27 16.1 | 7.769 | 8 557 | | |
| Mar. | 1 | 0 23.2 | 60 | 22 59 56.49 | 59 56.14 | 7 26 21.9 | 26 24.1 | 7.769 | 8.557 | | |
| | 2 | 0 19.4 | 61 | 23 0 4.96 | 0 4.63 | – 7 25 29.9 | 25 32.1 | +7.769 | +8.557 | | |

Note. — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE 1854.

**For Washington Sidereal Noon and Meridian Transit.**

| Mean Solar Time of Meridian Transit. | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| | d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Mar. | 3 0 15.6 | 62 | 23 0 13.44 | 0 13.11 | − 7 24 37.9 | 24 40.1 | +7.770 | +8.558 | | |
| | 4 0 11.8 | 63 | 23 0 21.92 | 0 21.59 | 7 23 45.9 | 23 48.1 | 7.770 | 8.558 | | |
| | 5 0 8.0 | 64 | 23 0 30.39 | 0 30.06 | 7 22 53.9 | 22 56.1 | 7.770 | 8.558 | | |
| | 6 0 4.3 | 65 | 23 0 38.86 | 0 38.53 | 7 22 1.9 | 22 4.2 | 7.770 | 8.557 | | |
| | 7 0 0.5 | 66 | 23 0 47.33 | 0 46.99 | 7 21 10.0 | 21 12.3 | 7.769 | 8.557 | | |
| | 7 23 56.7 | 67 | 23 0 55.79 | 0 55.45 | 7 20 18.1 | 20 20.4 | 7.769 | 8.556 | | |
| | 8 23 52.9 | 68 | 23 1 4.25 | 1 3.90 | 7 19 26.4 | 19 28.6 | 7.768 | 8.555 | | |
| | 9 23 49.1 | 69 | 23 1 12.70 | 1 12.34 | 7 18 34.7 | 18 36.9 | 7.768 | 8.554 | | |
| | 10 23 45.3 | 70 | 23 1 21.14 | 1 20.77 | 7 17 43.2 | 17 45.3 | 7.767 | 8.553 | | |
| | 11 23 41.5 | 71 | 23 1 29.56 | 1 29.19 | 7 16 51.7 | 16 53.9 | 7.767 | 8.552 | | |
| | 12 23 37.7 | 72 | 23 1 37.96 | 1 37.59 | 7 16 0.4 | 16 2.6 | 7.766 | 8.551 | | |
| | 13 23 33.9 | 73 | 23 1 46.34 | 1 45.98 | 7 15 9.2 | 15 11.4 | 7.765 | 8.550 | | |
| | 14 23 30.1 | 74 | 23 1 54.70 | 1 54.35 | 7 14 18.2 | 14 20.3 | 7.764 | 8.549 | | |
| | 15 23 26.3 | 75 | 23 2 3.04 | 2 2.70 | 7 13 27.3 | 13 29.4 | 7.763 | 8.548 | | |
| | 16 23 22.5 | 76 | 23 2 11.36 | 2 11.02 | 7 12 36.6 | 12 38.7 | 7.761 | 8.546 | | |
| | 17 23 18.7 | 77 | 23 2 19.65 | 2 19.32 | 7 11 46.1 | 11 48.1 | 7.760 | 8.545 | | |
| | 18 23 14.9 | 78 | 23 2 27.92 | 2 27.59 | 7 10 55.8 | 10 57.8 | 7.759 | 8.543 | | |
| | 19 23 11.1 | 79 | 23 2 36.16 | 2 35.84 | 7 10 5.6 | 10 7.6 | 7.758 | 8.541 | | |
| | 20 23 7.3 | 80 | 23 2 44.37 | 2 44.06 | 7 9 15.6 | 9 17.6 | 7.757 | 8.539 | | |
| | 21 23 3.5 | 81 | 23 2 52.55 | 2 52.24 | 7 8 25.8 | 8 27.8 | 7.755 | 8.538 | | |
| | 22 22 59.7 | 82 | 23 3 0.70 | 3 0.39 | 7 7 36.3 | 7 38.2 | 7.753 | 8.536 | | |
| | 23 22 55.9 | 83 | 23 3 8.81 | 3 8.51 | 7 6 47.0 | 6 48.9 | 7.751 | 8.534 | | |
| | 24 22 52.1 | 84 | 23 3 16.89 | 3 16.59 | 7 5 57.9 | 5 59.8 | 7.749 | 8.532 | | |
| | 25 22 48.3 | 85 | 23 3 24.93 | 3 24.63 | 7 5 9.1 | 5 11.0 | 7.746 | 8.529 | | |
| | 26 22 44.5 | 86 | 23 3 32.93 | 3 32.63 | 7 4 20.6 | 4 22.5 | 7.744 | 8.527 | | |
| | 27 22 40.7 | 87 | 23 3 40.89 | 3 40.59 | 7 3 32.4 | 3 34.2 | 7.742 | 8.524 | | |
| | 28 22 36.9 | 88 | 23 3 48.80 | 3 48.50 | 7 2 44.5 | 2 46.2 | 7.739 | 8.521 | | |
| | 29 22 33.1 | 89 | 23 3 56.67 | 3 56.37 | 7 1 56.9 | 1 58.6 | 7.736 | 8.518 | | |
| | 30 22 29.3 | 90 | 23 4 4.49 | 4 4.18 | 7 1 9.6 | 1 11.3 | 7.733 | 8.515 | | |
| | 31 22 25.5 | 91 | 23 4 12.25 | 4 11.95 | 7 0 22.7 | 0 24.4 | 7.730 | 8.512 | | |
| Apr. | 1 22 21.7 | 92 | 23 4 19.96 | 4 19.66 | 6 59 36.1 | 59 37.8 | 7.727 | 8.509 | | |
| | 2 22 17.9 | 93 | 23 4 27.61 | 4 27.32 | 6 58 49.9 | 58 51.6 | 7.723 | 8.505 | | |
| | 3 22 14.1 | 94 | 23 4 35.20 | 4 34.92 | 6 58 4.0 | 58 5.8 | 7.720 | 8.502 | | |
| | 4 22 10.3 | 95 | 23 4 42.74 | 4 42.47 | 6 57 18.5 | 57 20.3 | 7.717 | 8.498 | | |
| | 5 22 6.5 | 96 | 23 4 50.22 | 4 49.96 | 6 56 33.4 | 56 35.2 | 7.714 | 8.494 | | |
| | 6 22 2.7 | 97 | 23 4 57.64 | 4 57.39 | 6 55 48.7 | 55 50.5 | 7.711 | 8.490 | | |
| | 7 21 58.9 | 98 | 23 5 5.01 | 5 4.76 | 6 55 4.4 | 55 6.2 | 7.707 | 8.486 | | |
| | 8 21 55.1 | 99 | 23 5 12.31 | 5 12.06 | 6 54 20.5 | 54 22.3 | 7.703 | 8.482 | | |
| | 9 21 51.3 | 100 | 23 5 19.55 | 5 19.30 | 6 53 37.0 | 53 38.8 | 7.699 | 8.478 | | |
| | 10 21 47.5 | 101 | 23 5 26.73 | 5 26.48 | 6 52 54.0 | 52 55.7 | 7.695 | 8.473 | | |
| | 11 21 43.7 | 102 | 23 5 33.84 | 5 33.59 | 6 52 11.4 | 52 13.1 | 7.691 | 8.469 | | |
| | 12 21 39.9 | 103 | 23 5 40.88 | 5 40.63 | 6 51 29.2 | 51 30.9 | 7.687 | 8.464 | | |
| | 13 21 36.1 | 104 | 23 5 47.85 | 5 47.60 | 6 50 47.5 | 50 49.2 | 7.683 | 8.459 | | |
| | 14 21 32.2 | 105 | 23 5 54.75 | 5 54.50 | 6 50 6.3 | 50 7.9 | 7.678 | 8.454 | | |
| | 15 21 28.4 | 106 | 23 6 1.58 | 6 1.33 | 6 49 25.6 | 49 27.1 | 7.673 | 8.449 | | |
| | 16 21 24.6 | 107 | 23 6 8.33 | 6 8.08 | 6 48 45.3 | 48 46.8 | 7.668 | 8.444 | | |
| | 17 21 20.8 | 108 | 23 6 15.00 | 6 14.76 | 6 48 5.5 | 48 7.0 | 7.663 | 8.439 | | |
| | 18 21 16.9 | 109 | 23 6 21.60 | 6 21.36 | 6 47 26.2 | 47 27.7 | 7.658 | 8.433 | | |
| | 19 21 13.1 | 110 | 23 6 28.12 | 6 27.88 | 6 46 47.4 | 46 48.9 | 7.653 | 8.427 | | |
| | 20 21 9.3 | 111 | 23 6 34.56 | 6 34.32 | 6 46 9.1 | 46 10.6 | 7.648 | 8.421 | | |
| | 21 21 5.5 | 112 | 23 6 40.92 | 6 40.68 | 6 45 31.4 | 45 32.9 | 7.642 | 8.415 | | |
| | 22 21 1.7 | 113 | 23 6 47.19 | 6 46.96 | 6 44 54.2 | 44 55.7 | 7.636 | 8.408 | | |
| | 23 20 57.8 | 114 | 23 6 53.38 | 6 53.15 | 6 44 17.6 | 44 19.0 | 7.630 | 8.402 | | |
| | 24 20 54.0 | 115 | 23 6 59.48 | 6 59.26 | 6 43 41.5 | 43 42.9 | 7.624 | 8.396 | | |
| | 25 20 50.2 | 116 | 23 7 5.50 | 7 5.28 | 6 43 6.0 | 43 7.4 | 7.618 | 8.389 | | |
| | 26 20 46.3 | 117 | 23 7 11.43 | 7 11.22 | 6 42 31.1 | 42 32.4 | 7.612 | 8.382 | | |
| | 27 20 42.5 | 118 | 23 7 17.27 | 7 17.07 | 6 41 56.7 | 41 58.0 | 7.605 | 8.374 | | |
| | 28 20 38.7 | 119 | 23 7 23.02 | 7 22.82 | 6 41 22.9 | 41 24.2 | 7.598 | 8.366 | | |
| | 29 20 34.8 | 120 | 23 7 28.68 | 7 28.48 | 6 40 49.7 | 40 51.0 | 7.591 | 8.358 | | |
| | 30 20 31.0 | 121 | 23 7 34.24 | 7 34.05 | 6 40 17.1 | 40 18.4 | 7.583 | 8.350 | | |
| May | 1 20 27.1 | 122 | 23 7 39.71 | 7 39.52 | − 6 39 45.2 | 39 46.4 | +7.575 | +8.341 | | |

NOTE. — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE, 1854.

**For Washington Sidereal Noon and Meridian Transit.**

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| May 2 20 23.3 | 123 | 23 7 45.08 | 7 44.89 | − 6 39 13.9 | 39 15.1 | +7.567 | +8.332 | | |
| 3 20 19.5 | 124 | 23 7 50.35 | 7 50.16 | 6 38 43.2 | 38 44.4 | 7.559 | 8.323 | | |
| 4 20 15.6 | 125 | 23 7 55.52 | 7 55.34 | 6 38 13.2 | 38 14.3 | 7.551 | 8.314 | | |
| 5 20 11.8 | 126 | 23 8 0.59 | 8 0.41 | 6 37 43.8 | 37 44.9 | 7.543 | 8.305 | | |
| 6 20 7.9 | 127 | 23 8 5.56 | 8 5.39 | 6 37 15.0 | 37 16.1 | 7.534 | 8.296 | | |
| 7 20 4.1 | 128 | 23 8 10.44 | 8 10.26 | 6 36 46.9 | 36 47.9 | 7.525 | 8.286 | | |
| 8 20 0.2 | 129 | 23 8 15.21 | 8 15.04 | 6 36 19.4 | 36 20.4 | 7.516 | 8.276 | | |
| 9 19 56.4 | 130 | 23 8 19.88 | 8 19.72 | 6 35 52.6 | 35 53.6 | 7.507 | 8.265 | | |
| 10 19 52.5 | 131 | 23 8 24.45 | 8 24.29 | 6 35 26.4 | 35 27.4 | 7.497 | 8.254 | | |
| 11 19 48.6 | 132 | 23 8 28.92 | 8 28.76 | 6 35 0.9 | 35 1.8 | 7.487 | 8.243 | | |
| 12 19 44.7 | 133 | 23 8 33.28 | 8 33.12 | 6 34 36.1 | 34 36.9 | 7.476 | 8.231 | | |
| 13 19 40.9 | 134 | 23 8 37.53 | 8 37.38 | 6 34 11.9 | 34 12.6 | 7.465 | 8.219 | | |
| 14 19 37.0 | 135 | 23 8 41.68 | 8 41.53 | 6 33 48.4 | 33 49.0 | 7.454 | 8.206 | | |
| 15 19 33.2 | 136 | 23 8 45.72 | 8 45.58 | 6 33 25.6 | 33 26.2 | 7.442 | 8.193 | | |
| 16 19 29.3 | 137 | 23 8 49.65 | 8 49.51 | 6 33 3.5 | 33 4.1 | 7.430 | 8.179 | | |
| 17 19 25.5 | 138 | 23 8 53.47 | 8 53.34 | 6 32 42.1 | 32 42.7 | 7.418 | 8.165 | | |
| 18 19 21.6 | 139 | 23 8 57.18 | 8 57.05 | 6 32 21.4 | 32 22.0 | 7.405 | 8.150 | | |
| 19 19 17.7 | 140 | 23 9 0.78 | 9 0.66 | 6 32 1.4 | 32 2.0 | 7.392 | 8.134 | | |
| 20 19 13.8 | 141 | 23 9 4.27 | 9 4.15 | 6 31 42.1 | 31 42.8 | 7.378 | 8.118 | | |
| 21 19 10.0 | 142 | 23 9 7.65 | 9 7.53 | 6 31 23.6 | 31 24.3 | 7.363 | 8.101 | | |
| 22 19 6.1 | 143 | 23 9 10.91 | 9 10.79 | 6 31 5.8 | 31 6.5 | 7.347 | 8.084 | | |
| 23 19 2.3 | 144 | 23 9 14.06 | 9 13.94 | 6 30 48.7 | 30 49.5 | 7.331 | 8.065 | | |
| 24 18 58.4 | 145 | 23 9 17.09 | 9 16.98 | 6 30 32.4 | 30 33.2 | 7.314 | 8.046 | | |
| 25 18 54.5 | 146 | 23 9 20.00 | 9 19.90 | 6 30 16.8 | 30 17.6 | 7.297 | 8.026 | | |
| 26 18 50.6 | 147 | 23 9 22.80 | 9 22.70 | 6 30 1.9 | 30 2.7 | 7.280 | 8.004 | | |
| 27 18 46.7 | 148 | 23 9 25.48 | 9 25.39 | 6 29 47.8 | 29 48.5 | 7.262 | 7.981 | | |
| 28 18 42.8 | 149 | 23 9 28.05 | 9 27.96 | 6 29 34.4 | 29 35.1 | 7.242 | 7.956 | | |
| 29 18 38.9 | 150 | 23 9 30.50 | 9 30.41 | 6 29 21.8 | 29 22.4 | 7.221 | 7.930 | | |
| 30 18 35.0 | 151 | 23 9 32.83 | 9 32.75 | 6 29 9.9 | 29 10.5 | 7.198 | 7.902 | | |
| 31 18 31.1 | 152 | 23 9 35.05 | 9 34.97 | 6 28 58.8 | 28 59.3 | 7.175 | 7.873 | | |
| June 1 18 27.2 | 153 | 23 9 37.14 | 9 37.07 | 6 28 48.4 | 28 48.9 | 7.150 | 7.842 | | |
| 2 18 23.3 | 154 | 23 9 39.11 | 9 39.04 | 6 28 38.8 | 28 39.2 | 7.123 | 7.807 | | |
| 3 18 19.4 | 155 | 23 9 40.96 | 9 40.90 | 6 28 29.9 | 28 30.3 | 7.095 | 7.770 | | |
| 4 18 15.5 | 156 | 23 9 42.70 | 9 42.64 | 6 28 21.8 | 28 22.1 | 7.064 | 7.730 | | |
| 5 18 11.6 | 157 | 23 9 44.31 | 9 44.26 | 6 28 14.4 | 28 14.7 | 7.032 | 7.685 | | |
| 6 18 7.7 | 158 | 23 9 45.80 | 9 45.75 | 6 28 7.8 | 28 8.1 | 6.998 | 7.636 | | |
| 7 18 3.8 | 159 | 23 9 47.17 | 9 47.13 | 6 28 2.0 | 28 2.2 | 6.960 | 7.580 | | |
| 8 17 59.9 | 160 | 23 9 48.42 | 9 48.39 | 6 27 56.9 | 27 57.1 | 6.919 | 7.516 | | |
| 9 17 56.0 | 161 | 23 9 49.56 | 9 49.53 | 6 27 52.5 | 27 52.7 | 6.874 | 7.441 | | |
| 10 17 52.0 | 162 | 23 9 50.57 | 9 50.55 | 6 27 48.9 | 27 49.1 | 6.822 | 7.350 | | |
| 11 17 48.1 | 163 | 23 9 51.47 | 9 51.45 | 6 27 46.0 | 27 46.2 | 6.762 | 7.235 | | |
| 12 17 44.2 | 164 | 23 9 52.25 | 9 52.23 | 6 27 43.9 | 27 44.1 | 6.693 | 7.078 | | |
| 13 17 40.2 | 165 | 23 9 52.90 | 9 52.89 | 6 27 42.6 | 27 42.7 | 6.613 | 6.831 | | |
| 14 17 36.3 | 166 | 23 9 53.43 | 9 53.43 | 6 27 42.0 | 27 42.1 | 6.514 | +6.194 | | |
| 15 17 32.4 | 167 | 23 9 53.84 | 9 53.85 | 6 27 42.2 | 27 42.2 | 6.386 | −6.582 | | |
| 16 17 28.5 | 168 | 23 9 54.13 | 9 54.14 | 6 27 43.1 | 27 43.1 | 6.203 | 6.964 | | |
| 17 17 24.5 | 169 | 23 9 54.31 | 9 54.32 | 6 27 44.8 | 27 44.8 | +5.893 | 7.164 | | |
| 18 17 20.6 | 170 | 23 9 54.36 | 9 54.38 | 6 27 47.3 | 27 47.2 | −4.717 | 7.296 | | |
| 19 17 16.7 | 171 | 23 9 54.30 | 9 54.32 | 6 27 50.5 | 27 50.3 | 5.947 | 7.398 | | |
| 20 17 12.8 | 172 | 23 9 54.11 | 9 54.13 | 6 27 54.4 | 27 54.2 | 6.235 | 7.480 | | |
| 21 17 8.8 | 173 | 23 9 53.81 | 9 53.83 | 6 27 59.1 | 27 58.9 | 6.404 | 7.549 | | |
| 22 17 4.9 | 174 | 23 9 53.38 | 9 53.41 | 6 28 4.5 | 28 4.3 | 6.527 | 7.609 | | |
| 23 17 1.0 | 175 | 23 9 52.84 | 9 52.87 | 6 28 10.7 | 28 10.5 | 6.622 | 7.660 | | |
| 24 16 57.0 | 176 | 23 9 52.18 | 9 52.21 | 6 28 17.6 | 28 17.4 | 6.699 | 7.706 | | |
| 25 16 53.1 | 177 | 23 9 51.40 | 9 51.43 | 6 28 25.2 | 28 25.0 | 6.765 | 7.747 | | |
| 26 16 49.2 | 178 | 23 9 50.50 | 9 50.53 | 6 28 33.6 | 28 33.3 | 6.823 | 7.785 | | |
| 27 16 45.2 | 179 | 23 9 49.48 | 9 49.52 | 6 28 42.7 | 28 42.4 | 6.874 | 7.819 | | |
| 28 16 41.3 | 180 | 23 9 48.35 | 9 48.39 | 6 28 52.6 | 28 52.2 | 6.919 | 7.851 | | |
| 29 16 37.3 | 181 | 23 9 47.10 | 9 47.14 | 6 29 3.2 | 29 2.8 | 6.960 | 7 881 | | |
| 30 16 33.4 | 182 | 23 9 45.73 | 9 45.78 | 6 29 14.5 | 29 14.1 | 6.995 | 7.908 | | |
| July 1 16 29.4 | 183 | 23 9 44.25 | 9 44.30 | − 6 29 26.5 | 29 26.1 | −7.028 | −7.933 | | |

**Note.** — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

| Mean Solar Time of Meridian Transit. | | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log. of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| | d. | h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| July | 2 | 16 25.5 | 184 | 23 9 42.65 | 9 42.71 | − 6 29 39.2 | 29 38.8 | −7.059 | −7.957 | | |
| | 3 | 16 21.5 | 185 | 23 9 40.94 | 9 41.01 | 6 29 52.6 | 29 52.2 | 7.088 | 7.980 | | |
| | 4 | 16 17.6 | 186 | 23 9 39.12 | 9 39.19 | 6 30 6.7 | 30 6.2 | 7.115 | 8.001 | | |
| | 5 | 16 13.6 | 187 | 23 9 37.18 | 9 37.26 | 6 30 21.5 | 30 20.9 | 7.140 | 8.021 | | |
| | 6 | 16 9.6 | 188 | 23 9 35.14 | 9 35.22 | 6 30 36.9 | 30 36.3 | 7.165 | 8.040 | | |
| | 7 | 16 5.6 | 189 | 23 9 32.98 | 9 33.07 | 6 30 53.0 | 30 52.4 | 7.187 | 8.058 | | |
| | 8 | 16 1.6 | 190 | 23 9 30.71 | 9 30.81 | 6 31 9.8 | 31 9.2 | 7.209 | 8.075 | | |
| | 9 | 15 57.7 | 191 | 23 9 28.33 | 9 28.44 | 6 31 27.2 | 31 26.7 | 7.230 | 8.091 | | |
| | 10 | 15 53.7 | 192 | 23 9 25.85 | 9 25.96 | 6 31 45.3 | 31 44.8 | 7.247 | 8.107 | | |
| | 11 | 15 49.7 | 193 | 23 9 23.26 | 9 23.38 | 6 32 4.1 | 32 3.5 | 7.264 | 8.122 | | |
| | 12 | 15 45.7 | 194 | 23 9 20.57 | 9 20.69 | 6 32 23.5 | 32 22.9 | 7.280 | 8.136 | | |
| | 13 | 15 41.7 | 195 | 23 9 17.77 | 9 17.89 | 6 32 43.5 | 32 42.9 | 7.295 | 8.150 | | |
| | 14 | 15 37.8 | 196 | 23 9 14.87 | 9 14.99 | 6 33 4.2 | 33 3.5 | 7.310 | 8.163 | | |
| | 15 | 15 33.8 | 197 | 23 9 11.87 | 9 11.99 | 6 33 25.5 | 33 24.8 | 7.325 | 8.176 | | |
| | 16 | 15 29.8 | 198 | 23 9 8.77 | 9 8.89 | 6 33 47.4 | 33 46.7 | 7.340 | 8.188 | | |
| | 17 | 15 25.8 | 199 | 23 9 5.57 | 9 5.68 | 6 34 9.9 | 34 9.2 | 7.354 | 8.200 | | |
| | 18 | 15 21.8 | 200 | 23 9 2.27 | 9 2.37 | 6 34 33.1 | 34 32.3 | 7.367 | 8.211 | | |
| | 19 | 15 17.8 | 201 | 23 8 58.86 | 8 58.97 | 6 34 56.8 | 34 56.0 | 7.380 | 8.222 | | |
| | 20 | 15 13.8 | 202 | 23 8 55.35 | 8 55.47 | 6 35 21.1 | 35 20.3 | 7.392 | 8.232 | | |
| | 21 | 15 9.8 | 203 | 23 8 51.75 | 8 51.87 | 6 35 46.0 | 35 45.2 | 7.404 | 8.242 | | |
| | 22 | 15 5.8 | 204 | 23 8 48.05 | 8 48.18 | 6 36 11.5 | 36 10.6 | 7.415 | 8.252 | | |
| | 23 | 15 1.8 | 205 | 23 8 44.26 | 8 44.39 | 6 36 37.5 | 36 36.6 | 7.426 | 8.261 | | |
| | 24 | 14 57.8 | 206 | 23 8 40.37 | 8 40.51 | 6 37 4.1 | 37 3.2 | 7.436 | 8.270 | | |
| | 25 | 14 53.8 | 207 | 23 8 36.39 | 8 36.54 | 6 37 31.2 | 37 30.3 | 7.446 | 8.279 | | |
| | 26 | 14 49.8 | 208 | 23 8 32.33 | 8 32.48 | 6 37 58.8 | 37 57.9 | 7.455 | 8 287 | | |
| | 27 | 14 45.8 | 209 | 23 8 28.18 | 8 28.34 | 6 38 27.0 | 38 26.1 | 7.464 | 8.295 | | |
| | 28 | 14 41.8 | 210 | 23 8 23.95 | 8 24.11 | 6 38 55.7 | 38 54.8 | 7.473 | 8.303 | | |
| | 29 | 14 37.8 | 211 | 23 8 19.63 | 8 19.80 | 6 39 24.9 | 39 23.9 | 7.481 | 8.310 | | |
| | 30 | 14 33.8 | 212 | 23 8 15.23 | 8 15.40 | 6 39 54.6 | 39 53.5 | 7.489 | 8.317 | | |
| | 31 | 14 29.8 | 213 | 23 8 10.75 | 8 10.92 | 6 40 24.7 | 40 23.6 | 7.497 | 8.324 | | |
| Aug. | 1 | 14 25.8 | 214 | 23 8 6.19 | 8 6.36 | 6 40 55.3 | 40 54.2 | 7.505 | 8.330 | | |
| | 2 | 14 21.8 | 215 | 23 8 1.56 | 8 1.72 | 6 41 26.4 | 41 25.2 | 7.512 | 8.336 | | |
| | 3 | 14 17.8 | 216 | 23 7 56.85 | 7 57.01 | 6 41 57.9 | 41 56.6 | 7.519 | 8.342 | | |
| | 4 | 14 13.8 | 217 | 23 7 52.06 | 7 52.23 | 6 42 29.8 | 42 28.5 | 7.525 | 8.348 | | |
| | 5 | 14 9.7 | 218 | 23 7 47.20 | 7 47.38 | 6 43 2.1 | 43 0.8 | 7.531 | 8.354 | | |
| | 6 | 14 5.7 | 219 | 23 7 42.27 | 7 42.45 | 6 43 34.8 | 43 33.5 | 7.537 | 8.359 | | |
| | 7 | 14 1.7 | 220 | 23 7 37.28 | 7 37.46 | 6 44 7.9 | 44 6.6 | 7.543 | 8.364 | | |
| | 8 | 13 57.7 | 221 | 23 7 32.22 | 7 32.40 | 6 44 41.4 | 44 40.1 | 7.548 | 8.369 | | |
| | 9 | 13 53.7 | 222 | 23 7 27.10 | 7 27.28 | 6 45 15.2 | 45 14.0 | 7.554 | 8.374 | | |
| | 10 | 13 49.7 | 223 | 23 7 21.91 | 7 22.09 | 6 45 49.4 | 45 48.2 | 7.560 | 8.378 | | |
| | 11 | 13 45.7 | 224 | 23 7 16.66 | 7 16.84 | 6 46 23.9 | 46 22.7 | 7.565 | 8.383 | | |
| | 12 | 13 41.6 | 225 | 23 7 11.35 | 7 11.53 | 6 46 58.8 | 46 57.6 | 7.570 | 8.387 | | |
| | 13 | 13 37.6 | 226 | 23 7 5.97 | 7 6.16 | 6 47 34.0 | 47 32.8 | 7.575 | 8.391 | | |
| | 14 | 13 33.6 | 227 | 23 7 0.54 | 7 0.74 | 6 48 9.5 | 48 8.3 | 7.579 | 8.394 | | |
| | 15 | 13 29.6 | 228 | 23 6 55.06 | 6 55.26 | 6 48 45.3 | 48 44.1 | 7.583 | 8.398 | | |
| | 16 | 13 25.6 | 229 | 23 6 49.53 | 6 49.73 | 6 49 21.4 | 49 20.2 | 7.587 | 8.401 | | |
| | 17 | 13 21.6 | 230 | 23 6 43.95 | 6 44.15 | 6 49 57.8 | 49 56.5 | 7.591 | 8.404 | | |
| | 18 | 13 17.5 | 231 | 23 6 38.32 | 6 38.52 | 6 50 34.5 | 50 33.1 | 7.594 | 8.407 | | |
| | 19 | 13 13.5 | 232 | 23 6 32.64 | 6 32.85 | 6 51 11.4 | 51 10.0 | 7.598 | 8.410 | | |
| | 20 | 13 9.5 | 233 | 23 6 26.92 | 6 27.13 | 6 51 48.5 | 51 47.1 | 7.601 | 8.412 | | |
| | 21 | 13 5.5 | 234 | 23 6 21.16 | 6 21.37 | 6 52 25.8 | 52 24.4 | 7.604 | 8.415 | | |
| | 22 | 13 1.5 | 235 | 23 6 15.36 | 6 15.57 | 6 53 3.3 | 53 1.9 | 7.607 | 8.417 | | |
| | 23 | 12 57.4 | 236 | 23 6 9.52 | 6 9.74 | 6 53 41.0 | 53 39.6 | 7.610 | 8.419 | | |
| | 24 | 12 53.4 | 237 | 23 6 3.64 | 6 3.87 | 6 54 18.9 | 54 17.5 | 7.612 | 8.421 | | |
| | 25 | 12 49.4 | 238 | 23 5 57.73 | 5 57.96 | 6 54 57.0 | 54 55.5 | 7.614 | 8.423 | | |
| | 26 | 12 45.3 | 239 | 23 5 51.80 | 5 52.03 | 6 55 35.2 | 55 33.7 | 7.616 | 8.424 | | |
| | 27 | 12 41.3 | 240 | 23 5 45.84 | 5 46.07 | 6 56 13.5 | 56 12.0 | 7.618 | 8.425 | | |
| | 28 | 12 37.3 | 241 | 23 5 39.85 | 5 40.09 | 6 56 51.9 | 56 50.4 | 7.620 | 8.426 | | |
| | 29 | 12 33.2 | 242 | 23 5 33.84 | 5 34.08 | 6 57 30.4 | 57 28.9 | 7.622 | 8 427 | | |
| | 30 | 12 29.2 | 243 | 23 5 27.81 | 5 28.05 | 6 58 9.0 | 58 7.5 | 7.624 | 8.428 | | |
| | 31 | 12 25.2 | 244 | 23 5 21.76 | 5 22.01 | − 6 58 47.6 | 58 46.1 | −7.625 | −8.429 | | |

NOTE. — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

| Mean Solar Time of Meridian Transit. | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|
| | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| d. h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Sept. 1 12 21.1 | 245 | 23 5 15.70 | 5 15.95 | − 6 59 26.3 | 59 24.8 | −7.626 | −8.429 | | |
| 2 12 17.1 | 246 | 23 5 9.63 | 5 9.87 | 7 0 5.0 | 0 3.5 | 7.626 | 8.430 | | |
| 3 12 13.1 | 247 | 23 5 3.55 | 5 3.79 | 7 0 43.8 | 0 42.2 | 7.626 | 8.430 | | |
| 4 12 9.0 | 248 | 23 4 57.46 | 4 57.70 | 7 1 22.6 | 1 21.0 | 7.627 | 8.430 | | |
| 5 12 5.0 | 249 | 23 4 51.36 | 4 51.60 | 7 2 1.3 | 1 59.8 | 7.627 | 8.430 | | |
| 6 12 1.0 | 250 | 23 4 45.26 | 4 45.50 | 7 2 40.1 | 2 38.6 | 7.627 | 8.430 | | |
| 7 11 56.9 | 251 | 23 4 39.15 | 4 39.39 | 7 3 18.8 | 3 17.3 | 7.627 | 8.429 | | |
| 8 11 52.9 | 252 | 23 4 33.04 | 4 33.28 | 7 3 57.5 | 3 56.0 | 7.627 | 8.429 | | |
| 9 11 48.8 | 253 | 23 4 26.93 | 4 27.17 | 7 4 36.1 | 4 34.6 | 7.627 | 8.428 | | |
| 10 11 44.8 | 254 | 23 4 20.83 | 4 21.07 | 7 5 14.7 | 5 13.2 | 7.627 | 8.427 | | |
| 11 11 40.8 | 255 | 23 4 14.73 | 4 14.97 | 7 5 53.1 | 5 51.7 | 7.626 | 8.426 | | |
| 12 11 36.7 | 256 | 23 4 8.64 | 4 8.88 | 7 6 31.5 | 6 30.0 | 7.626 | 8.425 | | |
| 13 11 32.7 | 257 | 23 4 2.56 | 4 2.81 | 7 7 9.7 | 7 8.2 | 7.625 | 8.423 | | |
| 14 11 28.7 | 258 | 23 3 56.50 | 3 56.75 | 7 7 47.8 | 7 46.3 | 7.624 | 8.422 | | |
| 15 11 24.6 | 259 | 23 3 50.45 | 3 50.70 | 7 8 25.8 | 8 24.3 | 7.623 | 8.420 | | |
| 16 11 20.6 | 260 | 23 3 44.42 | 3 44.67 | 7 9 3.6 | 9 2.1 | 7.622 | 8.418 | | |
| 17 11 16.6 | 261 | 23 3 38.41 | 3 38.66 | 7 9 41.2 | 9 39.7 | 7.620 | 8.416 | | |
| 18 11 12.5 | 262 | 23 3 32.43 | 3 32.67 | 7 10 18.6 | 10 17.2 | 7.618 | 8.414 | | |
| 19 11 8.5 | 263 | 23 3 26.47 | 3 26.71 | 7 10 55.8 | 10 54.4 | 7.616 | 8.411 | | |
| 20 11 4.5 | 264 | 23 3 20.54 | 3 20.78 | 7 11 32.8 | 11 31.4 | 7.614 | 8.408 | | |
| 21 11 0.4 | 265 | 23 3 14.65 | 3 14.88 | 7 12 9.6 | 12 8.2 | 7.611 | 8.405 | | |
| 22 10 56.4 | 266 | 23 3 8.79 | 3 9.01 | 7 12 46.1 | 12 44.7 | 7.609 | 8.402 | | |
| 23 10 52.4 | 267 | 23 3 2.96 | 3 3.18 | 7 13 22.8 | 13 21.0 | 7.606 | 8.399 | | |
| 24 10 48.3 | 268 | 23 2 57.17 | 2 57.39 | 7 13 58.3 | 13 57.0 | 7.603 | 8.396 | | |
| 25 10 44.3 | 269 | 23 2 51.42 | 2 51.64 | 7 14 34.0 | 14 32.5 | 7.600 | 8.392 | | |
| 26 10 40.3 | 270 | 23 2 45.71 | 2 45.93 | 7 15 9.4 | 15 7.9 | 7.597 | 8.388 | | |
| 27 10 36.3 | 271 | 23 2 40.05 | 2 40.27 | 7 15 44.4 | 15 42.9 | 7.593 | 8.384 | | |
| 28 10 32.3 | 272 | 23 2 34.43 | 2 34.66 | 7 16 19.1 | 16 17.6 | 7.589 | 8.380 | | |
| 29 10 28.2 | 273 | 23 2 28.87 | 2 29.09 | 7 16 53.5 | 16 52.0 | 7.585 | 8.376 | | |
| 30 10 24.2 | 274 | 23 2 23.36 | 2 23.57 | 7 17 27.5 | 17 26.0 | 7.581 | 8.371 | | |
| Oct. 1 10 20.2 | 275 | 23 2 17.90 | 2 18.11 | 7 18 1.1 | 17 59.7 | 7.577 | 8.366 | | |
| 2 10 16.2 | 276 | 23 2 12.49 | 2 12.71 | 7 18 34.3 | 18 32.9 | 7.572 | 8.360 | | |
| 3 10 12.2 | 277 | 23 2 7.15 | 2 7.36 | 7 19 7.1 | 19 5.7 | 7.567 | 8.354 | | |
| 4 10 8.2 | 278 | 23 2 1.87 | 2 2.07 | 7 19 39.5 | 19 38.1 | 7.562 | 8.348 | | |
| 5 10 4.1 | 279 | 23 1 56.65 | 1 56.85 | 7 20 11.4 | 20 10.0 | 7.557 | 8.342 | | |
| 6 10 0.1 | 280 | 23 1 51.49 | 1 51.69 | 7 20 42.9 | 20 41.5 | 7.552 | 8.336 | | |
| 7 9 56.1 | 281 | 23 1 46.39 | 1 46.59 | 7 21 13.9 | 21 12.6 | 7.546 | 8.330 | | |
| 8 9 52.1 | 282 | 23 1 41.36 | 1 41.55 | 7 21 44.5 | 21 43.2 | 7.540 | 8.324 | | |
| 9 9 48.1 | 283 | 23 1 36.40 | 1 36.59 | 7 22 14.6 | 22 13.3 | 7.533 | 8.317 | | |
| 10 9 44.1 | 284 | 23 1 31.51 | 1 31.70 | 7 22 44.2 | 22 42.9 | 7.527 | 8.310 | | |
| 11 9 40.1 | 285 | 23 1 26.70 | 1 26.89 | 7 23 13.4 | 23 12.1 | 7.520 | 8.303 | | |
| 12 9 36.1 | 286 | 23 1 21.97 | 1 22.15 | 7 23 42.1 | 23 40.8 | 7.513 | 8.295 | | |
| 13 9 32.1 | 287 | 23 1 17.31 | 1 17.49 | 7 24 10.2 | 24 9.0 | 7.505 | 8.287 | | |
| 14 9 28.1 | 288 | 23 1 12.73 | 1 12.91 | 7 24 37.8 | 24 36.6 | 7.498 | 8.278 | | |
| 15 9 24.0 | 289 | 23 1 8.23 | 1 8.41 | 7 25 4.8 | 25 3.7 | 7.490 | 8.269 | | |
| 16 9 20.0 | 290 | 23 1 3.82 | 1 3.99 | 7 25 31.3 | 25 30.2 | 7.482 | 8.260 | | |
| 17 9 16.0 | 291 | 23 0 59.49 | 0 59.66 | 7 25 57.2 | 25 56.1 | 7.474 | 8.250 | | |
| 18 9 12.0 | 292 | 23 0 55.25 | 0 55.42 | 7 26 22.5 | 26 21.4 | 7.465 | 8.240 | | |
| 19 9 8.0 | 293 | 23 0 51.09 | 0 51.26 | 7 26 47.2 | 26 46.2 | 7.456 | 8.229 | | |
| 20 9 4.0 | 294 | 23 0 47.02 | 0 47.19 | 7 27 11.3 | 27 10.4 | 7.446 | 8.219 | | |
| 21 9 0.0 | 295 | 23 0 43.05 | 0 43.22 | 7 27 34.8 | 27 34.0 | 7.436 | 8.208 | | |
| 22 8 56.0 | 296 | 23 0 39.17 | 0 39.34 | 7 27 57.7 | 27 56.9 | 7.425 | 8.196 | | |
| 23 8 52.0 | 297 | 23 0 35.40 | 0 35.56 | 7 28 20.0 | 28 19.2 | 7.414 | 8.184 | | |
| 24 8 48.0 | 298 | 23 0 31.73 | 0 31.88 | 7 28 41.7 | 28 40.9 | 7.401 | 8.171 | | |
| 25 8 44.0 | 299 | 23 0 28.15 | 0 28.30 | 7 29 2.7 | 29 1.9 | 7.388 | 8.157 | | |
| 26 8 40.0 | 300 | 23 0 24.68 | 0 24.82 | 7 29 23.0 | 29 22.2 | 7.375 | 8.142 | | |
| 27 8 36.0 | 301 | 23 0 21.31 | 0 21.44 | 7 29 42.7 | 29 41.9 | 7.361 | 8.127 | | |
| 28 8 32.1 | 302 | 23 0 18.04 | 0 18.17 | 7 30 1.7 | 30 0.9 | 7.348 | 8.112 | | |
| 29 8 28.1 | 303 | 23 0 14.88 | 0 15.00 | 7 30 20.0 | 30 19.2 | 7.334 | 8.096 | | |
| 30 8 24.1 | 304 | 23 0 11.83 | 0 11.94 | 7 30 37.6 | 30 36.9 | 7.319 | 8.078 | | |
| 31 8 20.1 | 305 | 23 0 8.88 | 0 8.99 | − 7 30 54.5 | 30 53.9 | −7.304 | −8.060 | | |

NOTE. — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE, 1854.

**For Washington Sidereal Noon and Meridian Transit.**

| Mean Solar Time of Meridian Transit. | | | Sidereal Date. | Apparent Right Ascension. | | Apparent Declination. | | Log. of Motion in a Sidereal Minute. | | Log. of Factor for Second Diff's. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | At Sid. 0h. | At Trans. | At Sid. 0h. | At Trans. | In R.A. | In Dec. | In R.A. | In Dec. |
| | d. | h. m. | | h. m. s. | m. s. | ° ′ ″ | ′ ″ | | | | |
| Nov. | 1 | 8 16.1 | 306 | 23 0 6.03 | 0 6.15 | − 7 31 10.8 | 31 10.2 | −7.288 | −8.041 | | |
| | 2 | 8 12.2 | 307 | 23 0 3.30 | 0 3.41 | 7 31 26.4 | 31 25.8 | 7.270 | 8.021 | | |
| | 3 | 8 8.2 | 308 | 23 0 0.68 | 0 0.79 | 7 31 41.3 | 31 40.7 | 7.251 | 8.000 | | |
| | 4 | 8 4.2 | 309 | 22 59 58.17 | 59 58.27 | 7 31 55.4 | 31 54.8 | 7.231 | 7.978 | | |
| | 5 | 8 0.2 | 310 | 22 59 55.78 | 59 55.86 | 7 32 8.8 | 32 8.2 | 7.211 | 7.955 | | |
| | 6 | 7 56.3 | 311 | 22 59 53.50 | 59 53.57 | 7 32 21.4 | 32 20.9 | 7.189 | 7.930 | | |
| | 7 | 7 52.3 | 312 | 22 59 51.33 | 59 51.40 | 7 32 33.3 | 32 32.9 | 7.166 | 7.904 | | |
| | 8 | 7 48.3 | 313 | 22 59 49.28 | 59 49.35 | 7 32 44.5 | 32 44.1 | 7.141 | 7.877 | | |
| | 9 | 7 44.4 | 314 | 22 59 47.35 | 59 47.42 | 7 32 55.0 | 32 54.6 | 7.115 | 7.846 | | |
| | 10 | 7 40.4 | 315 | 22 59 45.54 | 59 45.60 | 7 33 4.7 | 33 4.3 | 7.087 | 7.811 | | |
| | 11 | 7 36.4 | 316 | 22 59 43.84 | 59 43.90 | 7 33 13.6 | 33 13.3 | 7.056 | 7.775 | | |
| | 12 | 7 32.5 | 317 | 22 59 42.26 | 59 42.33 | 7 33 21.8 | 33 21.5 | 7.023 | 7.734 | | |
| | 13 | 7 28.5 | 318 | 22 59 40.80 | 59 40.88 | 7 33 29.2 | 33 28.9 | 6.985 | 7.688 | | |
| | 14 | 7 24.6 | 319 | 22 59 39.47 | 59 39.55 | 7 33 35.8 | 33 35.6 | 6.945 | 7.637 | | |
| | 15 | 7 20.6 | 320 | 22 59 38.26 | 59 38.34 | 7 33 41.7 | 33 41.5 | 6.900 | 7.580 | | |
| | 16 | 7 16.7 | 321 | 22 59 37.18 | 59 37.25 | 7 33 46.8 | 33 46.6 | 6 849 | 7.514 | | |
| | 17 | 7 12.7 | 322 | 22 59 36.22 | 59 36.28 | 7 33 51.1 | 33 50.9 | 6.792 | 7.435 | | |
| | 18 | 7 8.8 | 323 | 22 59 35.39 | 59 35.44 | 7 33 54.6 | 33 54.4 | 6.727 | 7.336 | | |
| | 19 | 7 4.8 | 324 | 22 59 34.69 | 59 34.73 | 7 33 57.3 | 33 57.2 | 6.649 | 7.208 | | |
| | 20 | 7 0.9 | 325 | 22 59 34.11 | 59 34.14 | 7 33 59.2 | 33 59.2 | 6.556 | 7.025 | | |
| | 21 | 6 56.9 | 326 | 22 59 33.66 | 59 33.68 | 7 34 0.4 | 34 0.4 | 6.433 | −6.717 | | |
| | 22 | 6 53.0 | 327 | 22 59 33.33 | 59 33.35 | 7 34 0.8 | 34 0.8 | 6.261 | +5.541 | | |
| | 23 | 6 49.0 | 328 | 22 59 33.13 | 59 33.14 | 7 34 0.3 | 34 0.4 | 5.972 | 6.771 | | |
| | 24 | 6 45.1 | 329 | 22 59 33.06 | 59 33.06 | 7 33 59.1 | 33 59.2 | −4.717 | 7.059 | | |
| | 25 | 6 41.1 | 330 | 22 59 33.12 | 59 33.11 | 7 33 57.1 | 33 57.2 | +5.921 | 7.231 | | |
| | 26 | 6 37.2 | 331 | 22 59 33.30 | 59 33.29 | 7 33 54.3 | 33 54.4 | 6.240 | 7.353 | | |
| | 27 | 6 33.3 | 332 | 22 59 33.62 | 59 33.60 | 7 33 50.7 | 33 50.8 | 6.421 | 7.449 | | |
| | 28 | 6 29.4 | 333 | 22 59 34.06 | 59 34.04 | 7 33 46.3 | 33 46.4 | 6.547 | 7.527 | | |
| | 29 | 6 25.4 | 334 | 22 59 34.63 | 59 34.60 | 7 33 41.0 | 33 41.2 | 6.646 | 7.594 | | |
| | 30 | 6 21.5 | 335 | 22 59 35.33 | 59 35.29 | 7 33 34.9 | 33 35.2 | 6.725 | 7.649 | | |
| Dec. | 1 | 6 17.6 | 336 | 22 59 36.16 | 59 36.11 | 7 33 28.1 | 33 28.4 | 6.793 | 7.700 | | |
| | 2 | 6 13.7 | 337 | 22 59 37.11 | 59 37.06 | 7 33 20.5 | 33 20.8 | 6.851 | 7.745 | | |
| | 3 | 6 9.8 | 338 | 22 59 38.19 | 59 38.14 | 7 33 12.1 | 33 12.4 | 6.902 | 7.786 | | |
| | 4 | 6 5.9 | 339 | 22 59 39.40 | 59 39.34 | 7 33 2.9 | 33 3.2 | 6.948 | 7.823 | | |
| | 5 | 6 2.0 | 340 | 22 59 40.74 | 59 40.67 | 7 32 52.9 | 32 53.3 | 6.989 | 7.858 | | |
| | 6 | 5 58.1 | 341 | 22 59 42.20 | 59 42.13 | 7 32 42.1 | 32 42.6 | 7.027 | 7.889 | | |
| | 7 | 5 54.2 | 342 | 22 59 43.80 | 59 43.72 | 7 32 30.6 | 32 31.1 | 7.061 | 7.918 | | |
| | 8 | 5 50.3 | 343 | 22 59 45.52 | 59 45.44 | 7 32 18.3 | 32 18.8 | 7.093 | 7.946 | | |
| | 9 | 5 46.4 | 344 | 22 59 47.37 | 59 47.28 | 7 32 5.2 | 32 5.7 | 7.122 | 7.972 | | |
| | 10 | 5 42.5 | 345 | 22 59 49.34 | 59 49.25 | 7 31 51.3 | 31 51.9 | 7.149 | 7.997 | | |
| | 11 | 5 38.6 | 346 | 22 59 51.44 | 59 51.35 | 7 31 36.6 | 31 37.3 | 7.175 | 8.020 | | |
| | 12 | 5 34.7 | 347 | 22 59 53.66 | 59 53.57 | 7 31 21.1 | 31 21.9 | 7.200 | 8.042 | | |
| | 13 | 5 30.8 | 348 | 22 59 56.01 | 59 55.92 | 7 31 4.9 | 31 5.7 | 7.223 | 8.063 | | |
| | 14 | 5 26.9 | 349 | 22 59 58.49 | 59 58.39 | 7 30 47.9 | 30 48.7 | 7.246 | 8.082 | | |
| | 15 | 5 23.0 | 350 | 23 0 1.10 | 0 0.99 | 7 30 30.1 | 30 30.9 | 7.268 | 8.100 | | |
| | 16 | 5 19.1 | 351 | 23 0 3.83 | 0 3.72 | 7 30 11.6 | 30 12.4 | 7.288 | 8.118 | | |
| | 17 | 5 15.2 | 352 | 23 0 6.68 | 0 6.57 | 7 29 52.3 | 29 53.1 | 7.307 | 8.135 | | |
| | 18 | 5 11.4 | 353 | 23 0 9.66 | 0 9.54 | 7 29 32.2 | 29 33.1 | 7.325 | 8.152 | | |
| | 19 | 5 7.5 | 354 | 23 0 12.76 | 0 12.63 | 7 29 11.4 | 29 12.3 | 7.342 | 8.168 | | |
| | 20 | 5 3.6 | 355 | 23 0 15.98 | 0 15.85 | 7 28 49.8 | 28 50.8 | 7.358 | 8.183 | | |
| | 21 | 4 59.7 | 356 | 23 0 19.33 | 0 19.19 | 7 28 27.5 | 28 28.5 | 7.374 | 8.197 | | |
| | 22 | 4 55.9 | 357 | 23 0 22.80 | 0 22.65 | 7 28 4.5 | 28 5.5 | 7.389 | 8.211 | | |
| | 23 | 4 52.0 | 358 | 23 0 26.39 | 0 26.23 | 7 27 40.7 | 27 41.8 | 7.403 | 8.224 | | |
| | 24 | 4 48.1 | 359 | 23 0 30.09 | 0 29.93 | 7 27 16.2 | 27 17.4 | 7.417 | 8.237 | | |
| | 25 | 4 44.2 | 360 | 23 0 33.91 | 0 33.75 | 7 26 51.0 | 26 52.2 | 7.430 | 8.249 | | |
| | 26 | 4 40.4 | 361 | 23 0 37.85 | 0 37.68 | 7 26 25.1 | 26 26.3 | 7.443 | 8.261 | | |
| | 27 | 4 36.5 | 362 | 23 0 41.90 | 0 41.73 | 7 25 58.5 | 25 59.7 | 7.455 | 8.272 | | |
| | 28 | 4 32.6 | 363 | 23 0 46.07 | 0 45.90 | 7 25 31.2 | 25 32.4 | 7.467 | 8.283 | | |
| | 29 | 4 28.7 | 364 | 23 0 50.35 | 0 50.18 | 7 25 3.2 | 25 4.4 | 7.479 | 8.293 | | |
| | 30 | 4 24.9 | 365 | 23 0 54.75 | 0 54.57 | 7 24 34.6 | 24 35.8 | 7.490 | 8.303 | | |
| | 31 | 4 21.1 | 366 | 23 0 59.26 | 0 59.07 | − 7 24 5.3 | 24 6.5 | +7.501 | +8.313 | | |

NOTE — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

4/04

4/04